# Contrarian Investment, Extrapolation, and Risk

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### ABSTRACT

For many years, scholars and investment professionals have argued that value strategies outperform the market. These value strategies call for buying stocks that have low prices relative to earnings, dividends, book assets, or other measures of fundamental value. While there is some agreement that value strategies produce higher returns, the interpretation of why they do so is more controversial. This article provides evidence that value strategies yield higher returns because these strategies exploit the suboptimal behavior of the typical investor and not because these strategies are fundamentally riskier.

FOR MANY YEARS, SCHOLARS and investment professionals have argued that value strategies outperform the market (Graham and Dodd (1934) and Dreman (1977)). These value strategies call for buying stocks that have low prices relative to earnings, dividends, historical prices, book assets, or other measures of value. In recent years, value strategies have attracted academic attention as well. Basu (1977), Jaffe, Keim, and Westerfield (1989), Chan, Hamao, and Lakonishok (1991), and Fama and French (1992) show that stocks with high earnings/price ratios earn higher returns. De Bondt and Thaler (1985, 1987) argue that extreme losers outperform the market over the subsequent several years. Despite considerable criticism (Chan (1988) and Ball and Kothari (1989)), their analysis has generally stood up to the tests (Chopra, Lakonishok, and Ritter (1992)). Rosenberg, Reid, and Lanstein (1984) show that stocks with high book relative to market values of equity outperform the market. Further work (Chan, Hamao, and Lakonishok (1991)

and Fama and French (1992)) has both extended and refined these results. Finally, Chan, Hamao, and Lakonishok (1991) show that a high ratio of cash flow to price also predicts higher returns. Interestingly, many of these results have been obtained for both the United States and Japan. Certain types of value strategies, then, appear to have beaten the market.

While there is some agreement that value strategies have produced superior returns, the interpretation of why they have done so is more controversial. Value strategies might produce higher returns because they are *contrarian* to "naive"[1] strategies followed by other investors. These naive strategies might range from extrapolating past earnings growth too far into the future, to assuming a trend in stock prices, to overreacting to good or bad news, or to simply equating a good investment with a well-run company irrespective of price. Regardless of the reason, some investors tend to get overly excited about stocks that have done very well in the past and buy them up, so that these "glamour" stocks become overpriced. Similarly, they overreact to stocks that have done very badly, oversell them, and these out-of-favor "value" stocks become underpriced. Contrarian investors bet against such naive investors. Because contrarian strategies invest disproportionately in stocks that are underpriced and underinvest in stocks that are overpriced, they outperform the market (see De Bondt and Thaler (1985) and Haugen (1994)).

An alternative explanation of why value strategies have produced superior returns, argued most forcefully by Fama and French (1992), is that they are *fundamentally riskier*. That is, investors in value stocks, such as high book-to-market stocks, tend to bear higher fundamental risk of some sort, and their higher average returns are simply compensation for this risk. This argument is also used by critics of De Bondt and Thaler (Chan (1988) and Ball and Kothari (1989)) to dismiss their overreaction story. Whether value strategies have produced higher returns because they are contrarian to naive strategies or because they are fundamentally riskier remains an open question.

In this article, we try to shed further light on the two potential explanations for why value strategies work. We do so along two dimensions. First, we examine more closely the predictions of the contrarian model. In particular, one natural version of the contrarian model argues that the overpriced *glamour stocks* are those which, first, have performed well in the past, and second, are expected by the market to perform well in the future. Similarly, the underpriced out-of-favor or *value stocks* are those that have performed poorly in the past and are expected to continue to perform poorly. Value strategies that bet against those investors who extrapolate past performance too far into the future produce superior returns. In principle, this version of the contrarian model is testable because past performance and expectation of future performance are two distinct and separately measurable characteristics of glamour and value. In this article, past performance is measured using

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[1] What we call "naive strategies" are also sometimes referred to as "popular models" (Shiller (1984)) and "noise" (Black (1986)).

information on past growth in sales, earnings, and cash flow, and expected performance is measured by multiples of price to current earnings and cash flow.

We examine the most obvious implication of the contrarian model, namely that value stocks outperform glamour stocks. We start with simple one-variable classifications of glamour and value stocks that rely in most cases on measures of either past growth or expected future growth. We then move on to classifications in which glamour and value are defined using both past growth and expected future growth. In addition, we compare past, expected, and future growth rates of glamour and value stocks. Our version of the contrarian model predicts that differences in expected future growth rates are linked to past growth and overestimate actual future growth differences between glamour and value firms. We find that a wide range of value strategies have produced higher returns, and that the pattern of past, expected, and actual future growth rates is consistent with the contrarian model.

The second question we ask is whether value stocks are indeed fundamentally riskier than glamour stocks. To be fundamentally riskier, value stocks must underperform glamour stocks with some frequency, and particularly in the states of the world when the marginal utility of wealth is high. This view of risk motivates our tests. We look at the frequency of superior (and inferior) performance of value strategies, as well as at their performance in bad states of the world, such as extreme down markets and economic recessions. We also look at the betas and standard deviations of value and glamour strategies. We find little, if any, support for the view that value strategies are fundamentally riskier.

Our results raise the obvious question of how the higher expected returns on value strategies could have continued if such strategies are not fundamentally riskier? We present some possible explanations that rely both on behavioral strategies favored by individual investors and on agency problems plaguing institutional investors.

The next section of the article briefly discusses our methodology. Section II examines a variety of simple classification schemes for glamour and value stocks based on the book-to-market ratio, the cash flow-to-price ratio, the earnings-to-price ratio, and past growth in sales. Section II shows that all of these simple value strategies have produced superior returns and motivates our subsequent use of combinations of measures of past and expected growth. Section III then examines the performance of value strategies that are defined using both past growth and current multiples. These two-dimensional value strategies outperform glamour strategies by approximately 10 to 11 percent per year. Moreover, the superior performance of value stocks relative to glamour stocks persists when we restrict our attention to the largest 50 percent or largest 20 percent of stocks by market capitalization. Section IV provides evidence that contrarian strategies work because they exploit expectational errors implicit in stock prices. Specifically, the differences in expected growth rates between glamour and value stocks implicit in their

relative valuation multiples significantly overestimate actual future growth rate differences. Section V examines risk characteristics of value strategies and provides evidence that, over longer horizons, value strategies have outperformed glamour strategies quite consistently and have done particularly well in "bad" states of the world. This evidence provides no support for the hypothesis that value strategies are fundamentally riskier. Finally, Section VI attempts to interpret our findings.

## I. Methodology

The sample period covered in this study is from the end of April 1963 to the end of April 1990. Some of our formation strategies require 5 years of past accounting data. Consequently, we look at portfolios formed every year starting at the end of April 1968.[2] We examine subsequent performance and other characteristics of these portfolios for up to 5 years after formation using returns data from the Center for Research in Security Prices (CRSP) and accounting data from COMPUSTAT (including the research file). The universe of stocks is the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX).

A key question about this sample is whether results for stock returns are contaminated by significant look-ahead or survivorship bias (Banz and Breen (1986) and Kothari, Shanken, and Sloan (1992)). The potentially most serious bias is due to COMPUSTAT's major expansion of its database in 1978, which increased its coverage from 2,700 NYSE/AMEX firms and large National Association of Securities Dealers Automated Quotation (NASDAQ) firms to about 6,000 firms. Up to 5 years of data were added retroactively for many of these firms. As Kothari, Shanken, and Sloan (1992) point out, this raises the prospect of a look-ahead bias. Particularly among the firms that start out small or low priced, only those that perform well are added to the database. Hence, as one goes to lower and lower market valuation firms on COMPUSTAT, one finds that the population is increasingly selected from firms having good 5-year past performance records. This could potentially explain the positive association between low initial valuation and future returns. The potential bias toward high returns among low valuation firms is driven by data for the first 5 or so years that the firm appears on COMPUSTAT.

Our results potentially suffer from the same bias. However, our methodology differs from those in other recent studies in ways that should mitigate this bias. First, many of the strategies we focus on require 5 years of past data to classify firms before we start measuring returns. This means that we do not use returns for the first 5 years that the firm appears on COMPUSTAT to evaluate our strategies. But these first 5 years of returns is where the look-ahead bias in returns is found. Second, we study only NYSE and AMEX firms. The major expansion of COMPUSTAT largely involved adding

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[2] We form portfolios in April to ensure that the previous year's accounting numbers were available at the time of formation.

(successful) NASDAQ firms. Finally, we also report results for the largest 50 percent of firms on the NYSE and AMEX. The selection bias is less serious among these larger firms (La Porta (1993)).

Within each of our portfolios, we equally weight all the stocks and compute returns using an annual buy-and-hold strategy for Years $+1, +2, \dots, +5$ relative to the time of formation. If a stock disappears from CRSP during a year, its return is replaced until the end of the year with the return on a corresponding size decile portfolio. At the end of each year, the portfolio is rebalanced and each surviving stock gets the same weight.

For most of our results, we present size-adjusted returns as well as raw returns. To adjust portfolio returns for size, we first identify, for every stock in the sample, its market capitalization decile at the end of the previous year. We then construct a size benchmark return for each portfolio as follows. For each stock in the portfolio, replace its return in each year with an annual buy-and-hold return on an equally weighted portfolio of all stocks in its size decile for that year. Then equally weight these returns across all stocks in the original portfolio. The annual size-adjusted return on the original portfolio is then computed as the return on that portfolio minus the return on that year's size benchmark portfolio.

In addition to returns for the various portfolios, we compute growth rates and multiples for accounting measures such as sales, earnings, and cash flow. All accounting variables are taken from COMPUSTAT. Earnings are measured before extraordinary items, and cash flow is defined as earnings plus depreciation.

Let us illustrate our procedure for computing growth rates using the case of earnings growth from Year $-4$ to Year $-3$ relative to portfolio formation. We consider the portfolio that invests \$1 in each stock at the end of Year $-4$. This fixes the proportion of each firm owned at 1/(market capitalization), where market capitalization is calculated at the end of Year $-4$. We then calculate the earnings per dollar invested that are generated by this portfolio in each of Years $-4$ and $-3$ as follows. For each stock in the portfolio, we multiply total firm earnings by the proportion of the firm owned. We then sum these numbers across all stocks in the portfolio for that year and divide by the number of stocks in the portfolio. Computing growth rates from these numbers is complicated by the fact that the earnings (and cash flows) are negative for some entire portfolios for some years.[3] This makes it impossible to compute the average earnings growth rate from period $-4$ to period $-3$ as the average of the $(-4, -3)$ growth rates across all 22 formation periods since, for some formation periods, the base Year $-4$ earnings is negative. Even without the negative earnings years, these year-to-year growth rates are highly volatile because the base year's earnings were sometimes very close to zero. This makes year-by-year averaging of growth rates unreliable. To deal with these problems, we average Year $-4$ and Year $-3$ portfolio

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[3] Obviously, there is no such problem for sales. However, for symmetry we use the same methodology to compute growth rates of sales, earnings, and cash flow.

earnings across all 22 formation periods *before* computing growth rates. Hence, the earnings growth rate from Year $-4$ to Year $-3$ is computed as $(AE_{(-3)} - AE_{(-4)})/AE_{(-4)}$ where $AE_{(-3)}$ and $AE_{(-4)}$ are just the averages across all formation periods of the portfolio earnings in Years $-3$ and $-4$. In this fashion, we compute the growth rate in earnings, cash flow, and sales for each portfolio and for each year prior and postformation.

Finally, we compute several accounting ratios, such as cash-flow-to-price and earnings-to-price. These ratios are also used to sort individual stocks into portfolios. For these classifications, we consider only stocks with positive ratios of cash flow-to-price or earnings-to-price because negative ratios cannot be interpreted in terms of expected growth rates.[4] For purposes other than classifying individual stocks into portfolios, these ratios are computed for the entire equally weighted portfolios (and then averaged across all formation periods) without eliminating individual stocks in the portfolio that have negative values for the variable. For example, we compute the cash flow-to-price ratio for each stock and then take the average over all stocks in the portfolio. This gives us the cash flow per $1 invested in the portfolio where each stock receives the same dollar investment.

## II. Simple Glamour and Value Strategies

Table I, Panel A presents the returns on a strategy that has received a lot of attention recently (Fama and French (1992)), namely the book-to-market strategy. We divide the universe of stocks annually into book-to-market $(B/M)$ deciles, where book value is taken from COMPUSTAT for the end of the previous fiscal year, and market value is taken from CRSP as the market value of equity at portfolio formation time. In general, we focus on long-horizon returns (of up to 5 years) on various strategies. The reason for looking at such long horizons is that we are interested in performance of alternative investment strategies over horizons suitable for long-term investors. Moreover, we assume annual buy and hold periods in contrast to monthly buy and hold periods assumed in most previous studies. Because of various market microstructure issues as well as execution costs, our procedure produces returns that are closer to those that investors can actually capture. We defer statistical testing of return differences across value and glamour portfolios to

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[4] While we would ultimately like to say something about the future returns of firms with negative earnings, not including them here should not be viewed as a source of bias. As long as our strategy is feasible, in the sense that it constructs portfolios based on characteristics that were observable at the time of portfolio formation (see our discussion on look-ahead biases), the estimated differences in returns should be viewed as an unbiased measure of actual return differences *between subsets of firms that are all part of the set of firms with positive earnings.* While a strategy that incorporates the negative earnings firms may produce different returns, this is quite a different strategy from the one that we are studying. In our regression in Table IV, we do include firms with negative earnings or cash flow by separately including a dummy variable for negative earnings or cash flow along with the actual $E/P$ ratio or $C/P$ ratio if the numerator is positive.

Table VI where year-by-year return differences are reported starting in April 1968 and ending in April 1990.

In Panel A of Table I, we present the returns for Years 1 through 5 after the formation ($R_1$ through $R_5$), the average annual 5-year return ($AR$), the cumulative 5-year return ($CR_5$), and the size-adjusted average annual 5-year return ($SAAR$). The numbers presented are the averages across all formation periods in the sample. The results confirm and extend the results established by Rosenberg, Reid, and Lanstein (1984), Chan, Hamao, and Lakonishok (1991), and Fama and French (1992). On average over the postformation years, the low $B/M$ (glamour) stocks have an average annual return of 9.3 percent and the high $B/M$ (value) stocks have an average annual return of 19.8 percent, for a difference of 10.5 percent per year. If portfolios are held with the limited rebalancing described above, then cumulatively value stocks outperform glamour stocks by 90 percent over Years 1 through 5. Adjusting for size reduces the estimated return differences between value and glamour stocks somewhat, but the differences are still quite large. The size-adjusted average annual return is $-4.3$ percent for glamour stocks and 3.5 percent for value stocks, for a difference of 7.8 percent.

The natural question is: what is the $B/M$ ratio really capturing? Unfortunately, many different factors are reflected in this ratio. A low $B/M$ may describe a company with a lot of intangible assets, such as research and development (R & D) capital, that are not reflected in the accounting book value because R & D is expensed. A low $B/M$ can also describe a company with attractive growth opportunities that do not enter the computation of book value but do enter the market price. Also, a natural resource company, such as an oil producer without good growth opportunities but with high temporary profits, might have a low $B/M$ after an increase in oil prices. A stock whose risk is low and future cash flows are discounted at a low rate would have a low $B/M$ as well. Finally, a low $B/M$ may describe an overvalued glamour stock. The point here is simple: although the returns to the $B/M$ strategy are impressive, $B/M$ is not a "clean" variable uniquely associated with economically interpretable characteristics of the firms.

Arguably, the most important of such economically interpretable characteristics are the market's expectations of future growth and the past growth of these firms. To proxy for expected growth, we use ratios of various measures of profitability to price, so that firms with lower ratios have *higher* expected growth. The idea behind this is Gordon's formula, which states that $P = D(+1)/(r - g)$, where $D(+1)$ is next period's dividend, $P$ is the current stock price, $r$ is the required rate of return on the stock, and $g$ is the expected growth rate of dividends (Gordon and Shapiro (1956)). A similar formula applies to cash flow and earnings. For example, to get an expression in terms of cash flow, we write $D(+1) = \rho C(+1)$, where $C(+1)$ is next period's cash flow and $\rho$, the payout ratio, is the constant fraction of cash flow paid out as dividends. We can then write $P = \rho C(+1)/(r - g)$ where the growth rate $g$ for dividends is also the growth rate for cash flow on the assumption that dividends are proportional to cash flow. A similar formula

Table I

## Returns for Decile Portfolios Based on One-Dimensional Classifications by Various Measures of Value

At the end of each April between 1968 and 1989, 10-decile portfolios are formed in ascending order based on $B/M$, $C/P$, $E/P$, and $GS$. $B/M$ is the ratio of book value of equity to market value of equity; $C/P$ is the ratio of cash flow to market value of equity; $E/P$ is the ratio of earnings to market value of equity, and $GS$ refers to preformation 5-year average growth rate of sales. The returns presented in the table are averages over all formation periods. $R_t$ is the average return in year $t$ after formation, $t = 1, \ldots, 5$. $AR$ is the average annual return over 5 postformation years. $CR_5$ is the compounded 5-year return assuming annual rebalancing. $SAAR$ is the average annual size-adjusted return computed over 5 postformation years. The glamour portfolio refers to the decile portfolio containing stocks ranking lowest on $B/M$, $C/P$, or $E/P$, or highest on $GS$. The value portfolio refers to the decile portfolio containing stocks ranking highest on $B/M$, $C/P$, or $E/P$, or lowest on $GS$.

| | Glamour | | | | | | | | | Value |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | Panel A: $B/M$ | | | | | | |
| $R_1$ | 0.110 | 0.117 | 0.135 | 0.123 | 0.131 | 0.154 | 0.154 | 0.170 | 0.183 | 0.173 |
| $R_2$ | 0.079 | 0.107 | 0.140 | 0.145 | 0.153 | 0.156 | 0.169 | 0.164 | 0.182 | 0.188 |
| $R_3$ | 0.107 | 0.132 | 0.155 | 0.167 | 0.165 | 0.172 | 0.191 | 0.207 | 0.196 | 0.204 |
| $R_4$ | 0.081 | 0.133 | 0.136 | 0.160 | 0.170 | 0.169 | 0.188 | 0.204 | 0.213 | 0.207 |
| $R_5$ | 0.088 | 0.137 | 0.163 | 0.175 | 0.171 | 0.176 | 0.216 | 0.201 | 0.206 | 0.215 |
| $AR$ | 0.093 | 0.125 | 0.146 | 0.154 | 0.158 | 0.166 | 0.184 | 0.189 | 0.196 | 0.198 |
| $CR_5$ | 0.560 | 0.802 | 0.973 | 1.045 | 1.082 | 1.152 | 1.320 | 1.375 | 1.449 | 1.462 |
| $SAAR$ | −0.043 | −0.020 | −0.003 | 0.004 | 0.006 | 0.012 | 0.024 | 0.028 | 0.033 | 0.035 |
| | | | | Panel B: $C/P$ | | | | | | |
| $R_1$ | 0.084 | 0.124 | 0.140 | 0.140 | 0.153 | 0.148 | 0.157 | 0.178 | 0.183 | 0.183 |
| $R_2$ | 0.067 | 0.108 | 0.126 | 0.153 | 0.156 | 0.170 | 0.177 | 0.180 | 0.183 | 0.190 |
| $R_3$ | 0.096 | 0.133 | 0.153 | 0.172 | 0.170 | 0.191 | 0.191 | 0.202 | 0.193 | 0.204 |
| $R_4$ | 0.098 | 0.111 | 0.146 | 0.159 | 0.166 | 0.172 | 0.182 | 0.192 | 0.223 | 0.218 |
| $R_5$ | 0.108 | 0.134 | 0.161 | 0.162 | 0.187 | 0.177 | 0.191 | 0.209 | 0.212 | 0.208 |
| $AR$ | 0.091 | 0.122 | 0.145 | 0.157 | 0.166 | 0.171 | 0.180 | 0.192 | 0.199 | 0.201 |
| $CR_5$ | 0.543 | 0.779 | 0.969 | 1.074 | 1.158 | 1.206 | 1.283 | 1.406 | 1.476 | 1.494 |
| $SAAR$ | −0.049 | −0.025 | −0.006 | 0.005 | 0.013 | 0.019 | 0.025 | 0.034 | 0.037 | 0.039 |

would apply to earnings but with a different payout ratio. According to these expressions, *holding discount rates and payout ratios constant*,[5] a high cash flow-to-price $(C/P)$ firm has a low expected growth rate of cash flow, while a low $C/P$ firm has a high expected growth rate of cash flow, and similarly for the ratio of earnings-to-price $(E/P)$.[6] While the assumption of a constant

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[5] In Section V, we compare risk characteristics, and hence appropriate discount rates, of the various portfolios.

[6] An alternative approach is to use analysts' forecasts to proxy for expectations of future growth. This approach is used by La Porta (1993).

**Table I**—*Continued*

| | Glamour | | | | | | | | | Value |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | *Panel C: E/P* | | | | | | |
| $R_1$ | 0.123 | 0.125 | 0.140 | 0.130 | 0.135 | 0.156 | 0.170 | 0.180 | 0.193 | 0.162 |
| $R_2$ | 0.101 | 0.113 | 0.124 | 0.143 | 0.167 | 0.164 | 0.180 | 0.185 | 0.183 | 0.174 |
| $R_3$ | 0.118 | 0.138 | 0.157 | 0.171 | 0.171 | 0.191 | 0.198 | 0.188 | 0.188 | 0.195 |
| $R_4$ | 0.111 | 0.124 | 0.145 | 0.151 | 0.157 | 0.159 | 0.198 | 0.199 | 0.205 | 0.214 |
| $R_5$ | 0.119 | 0.129 | 0.151 | 0.167 | 0.171 | 0.168 | 0.196 | 0.201 | 0.211 | 0.207 |
| *AR* | 0.114 | 0.126 | 0.143 | 0.152 | 0.160 | 0.167 | 0.188 | 0.191 | 0.196 | 0.190 |
| $CR_5$ | 0.717 | 0.808 | 0.953 | 1.031 | 1.102 | 1.168 | 1.370 | 1.393 | 1.446 | 1.388 |
| *SAAR* | −0.035 | −0.024 | −0.009 | −0.001 | 0.005 | 0.013 | 0.026 | 0.026 | 0.029 | 0.019 |
| | | | | *Panel D: GS* | | | | | | |
| | Value | | | | | | | | | Glamour |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| $R_1$ | 0.187 | 0.183 | 0.164 | 0.169 | 0.162 | 0.157 | 0.159 | 0.164 | 0.142 | 0.114 |
| $R_2$ | 0.181 | 0.180 | 0.186 | 0.169 | 0.166 | 0.162 | 0.152 | 0.157 | 0.147 | 0.131 |
| $R_3$ | 0.204 | 0.206 | 0.194 | 0.186 | 0.181 | 0.180 | 0.168 | 0.178 | 0.157 | 0.138 |
| $R_4$ | 0.205 | 0.193 | 0.201 | 0.190 | 0.181 | 0.174 | 0.160 | 0.153 | 0.167 | 0.126 |
| $R_5$ | 0.197 | 0.213 | 0.194 | 0.199 | 0.168 | 0.184 | 0.185 | 0.168 | 0.163 | 0.125 |
| *AR* | 0.195 | 0.195 | 0.188 | 0.183 | 0.171 | 0.171 | 0.165 | 0.164 | 0.155 | 0.127 |
| $CR_5$ | 1.434 | 1.435 | 1.364 | 1.314 | 1.205 | 1.206 | 1.144 | 1.136 | 1.057 | 0.818 |
| *SAAR* | 0.022 | 0.027 | 0.025 | 0.024 | 0.015 | 0.015 | 0.008 | 0.008 | 0.000 | −0.024 |

growth rate for dividends and strict proportionality between cash flow (or earnings) and dividends are restrictive, the intuition behind Gordon's formula is quite general. Differences in $C/P$ or $E/P$ ratios across stocks should proxy for differences in expected growth rates.[7]

Panel B of Table I presents the results of sorting on the ratio of $C/P$. High $C/P$ stocks are identified with value stocks because their growth rate of cash flow is expected to be low, or, alternatively, their prices are low per dollar of cash flow. Conversely, low $C/P$ stocks are glamour stocks. On average, over the 5 postformation years, first-decile $C/P$ stocks have a return of 9.1 percent per annum, whereas the tenth-decile $C/P$ stocks have an average return of 20.1 percent per annum, for a difference of 11 percent. The 5-year cumulative returns are 54.3 percent and 149.4 percent, respectively, for a difference of 95.1 percent. On a size-adjusted basis, the difference in returns is 8.8 percent per annum. Sorting on $C/P$ thus appears to produce somewhat

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[7] We use current cash flow and earnings rather than one-period-ahead numbers because we require our investment strategies to be functions of observable variables only.

bigger differences in returns than sorting on $B/M$ ratios. This is consistent with the idea that measuring the market's expectations of future growth more directly gives rise to better value strategies.[8]

Another popular multiple, studied by Basu (1977), is the $E/P$. Table I, Panel C presents our results for $E/P$. On average, over the 5 postformation years, first-decile $E/P$ stocks have an average annual return of 11.4 percent and tenth-decile $E/P$ stocks have an average annual return of 19.0 percent, for a difference of 7.6 percent. On a size-adjusted basis, the difference in returns is 5.4 percent per annum. Low $E/P$ stocks underperform high $E/P$ stocks by a fairly wide margin, although the difference is not as large as that between extreme $B/M$ or $C/P$ deciles. One possible reason for this is that stocks with temporarily depressed earnings are lumped together with well-performing glamour stocks in the high expected growth/low $E/P$ category. These stocks with depressed earnings do not experience the same degree of poor future stock performance as the glamour stocks, perhaps because they are less overpriced by the market.

An alternative way to operationalize the notions of glamour and value is to classify stocks based on past growth rather than by expectations of future growth. We measure past growth by growth in sales ($GS$) since sales is less volatile than either cash flow or earnings, particularly for stocks in the extreme portfolios that we are most interested in. Specifically, for each company for each of Years $-1, -2, \ldots, -5$ prior to formation, we calculate the $GS$ in that year. Then, for each year, we rank all firms by $GS$ for that year. We then compute each firm's weighted average rank, giving the weight of 5 to its growth rank in Year $-1$, the weight of 4 to its growth rank in Year $-2$, etc. Finally, we form deciles based on each stock's weighted average sales growth rank. This procedure is a crude way to both pick out stocks with consistently high past $GS$, and to give greater weight to more recent sales growth in ranking stocks.[9]

Table I, Panel D presents the results for the $GS$ strategy. On average, over the 5 postformation years, the portfolio of firms in the lowest decile of past sales growth earns an average return of 19.5 percent per annum and the portfolio of firms in the highest decile earns an average return of 12.7 percent per annum. On a size-adjusted basis the average annual abnormal returns are 2.2 percent for the low $GS$ strategy and $-2.4$ percent for the high $GS$ strategy. These magnitudes are not as dramatic as those for the $B/M$ and $C/P$ strategies, nevertheless the spread in returns is sizeable.

In this section, we have largely confirmed and extended the results of others. A wide variety of simple value strategies based on classification of firms by a single fundamental variable produce very large returns over the 22-year period April 1968 to April 1990. In contrast to previous work, our

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[8] La Porta (1993) shows that contrarian strategies based directly on analysts' forecasts of future growth can produce even larger returns than those based on financial ratios.

[9] We have also tried a procedure in which we equally weight the ranks for all 5 years of past sales growth and obtain very similar results.

strategies involve classifying firms based on fundamentals and then buying and holding for 5 years. In the next section, we explore more sophisticated two-dimensional versions of these strategies that are designed to correct some of the misclassification of firms inherent in a one-variable approach. For example, low $E/P$ stocks, which are supposedly glamour stocks, include many stocks with temporarily depressed earnings that are expected to recover. The two-dimensional strategies of the next section are formulated with an eye toward more directly exploiting the possible mistakes made by naive investors.

## III. Anatomy of a Contrarian Strategy

### A. Performance of Contrarian Strategies

Much psychological evidence indicates that individuals form their predictions of the future without a full appreciation of mean reversion. That is, individuals tend to base their expectations on past data for the individual case they are considering without properly weighting data on what psychologists call the "base rate," or the class average. Kahneman and Tversky (1982, p. 417) explain:

> One of the basic principles of statistical prediction, which is also one of the least intuitive, is that the extremeness of predictions must be moderated by considerations of predictability ... Predictions are allowed to match impressions only in the case of perfect predictability. In intermediate situations, which are of course the most common, the prediction should be regressive; that is, it should fall between the class average and the value that best represents one's impression of the case at hand. The lower the predictability the closer the prediction should be to the class average. Intuitive predictions are typically nonregressive: people often make extreme predictions on the basis of information whose reliability and predictive validity are known to be low ...

To exploit this flaw of intuitive forecasts, contrarian investors should sell stocks with high past growth as well as high expected future growth and buy stocks with low past growth as well as low expected future growth. Prices of these stocks are most likely to reflect the failure of investors to impose mean reversion on growth forecasts. Accordingly, we define a glamour stock to be a stock with high growth in the past and high expected future growth. A value stock must have had low growth in the past and be expected by the market to continue growing slowly. In this section, we continue to use high ratios of $C/P$ ($E/P$) as a proxy for a low expected growth rate.

Table II, Panel A presents the results for the strategy that sorts on both $GS$ and $C/P$. Since we are sorting on two variables, sorting stocks into deciles on each variable is impractical. Accordingly, we independently sort stocks into three groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) by $GS$ and by $C/P$, and then take intersections resulting

## Table II

## Returns for Portfolios Based on Two-Dimensional Classifications by Various Measures of Value

At the end of each April between 1968 and 1989, 9 groups of stocks are formed. The stocks are independently sorted in ascending order into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) based on each of two variables. The sorts are for 5 pairs of variables: $C/P$ and $GS$, $B/M$ and $GS$, $E/P$ and $GS$, $E/P$ and $B/M$, and $B/M$ and $C/P$. $C/P$ is the ratio of cash flow to market value of equity; $B/M$ is the ratio of book value of equity to market value of equity; $E/P$ is the ratio of earnings to market value of equity; and $GS$ refers to preformation 5-year average growth rate of sales. The returns presented in the table are averages over all formation periods. $R_t$ is the average return in year $t$ after formation, $t = 1, \ldots, 5$. $AR$ is the average annual return over 5 postformation years. $CR_5$ is the compounded 5-year return assuming annual rebalancing. $SAAR$ is the average annual size-adjusted return computed over 5 postformation years. Depending on the two variables being used for classification, the value portfolio either refers to the portfolio containing stocks ranked in the top group (3) on both variables from among $C/P$, $E/P$, or $B/M$, or else the portfolio containing stocks ranking in the top group on one of those variables and in the bottom group (1) on $GS$. The glamour portfolio contains stocks with precisely the opposite set of rankings.

| | | | Panel A: $C/P$ and $GS$ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Glamour | | | | Value | | |
| $C/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $R_1$ | 0.157 | 0.131 | 0.113 | 0.181 | 0.156 | 0.139 | 0.215 | 0.202 | 0.137 |
| $R_2$ | 0.147 | 0.120 | 0.100 | 0.191 | 0.165 | 0.167 | 0.213 | 0.188 | 0.165 |
| $R_3$ | 0.165 | 0.140 | 0.121 | 0.197 | 0.190 | 0.165 | 0.227 | 0.195 | 0.172 |
| $R_4$ | 0.164 | 0.124 | 0.114 | 0.198 | 0.169 | 0.166 | 0.231 | 0.204 | 0.177 |
| $R_5$ | 0.179 | 0.135 | 0.121 | 0.200 | 0.173 | 0.151 | 0.218 | 0.216 | 0.184 |
| $AR$ | 0.162 | 0.130 | 0.114 | 0.193 | 0.171 | 0.157 | 0.221 | 0.201 | 0.167 |
| $CR_5$ | 1.122 | 0.843 | 0.712 | 1.419 | 1.200 | 1.076 | 1.711 | 1.497 | 1.163 |
| $SAAR$ | −0.006 | −0.020 | −0.033 | 0.030 | 0.014 | 0.003 | 0.054 | 0.036 | 0.008 |

| | | | Panel B: $E/P$ and $GS$ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Glamour | | | | Value | | |
| $E/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $R_1$ | 0.184 | 0.148 | 0.118 | 0.188 | 0.153 | 0.139 | 0.224 | 0.205 | 0.174 |
| $R_2$ | 0.167 | 0.134 | 0.100 | 0.204 | 0.174 | 0.154 | 0.214 | 0.187 | 0.190 |
| $R_3$ | 0.185 | 0.153 | 0.119 | 0.222 | 0.189 | 0.169 | 0.221 | 0.198 | 0.189 |
| $R_4$ | 0.190 | 0.138 | 0.103 | 0.205 | 0.175 | 0.160 | 0.232 | 0.217 | 0.188 |
| $R_5$ | 0.189 | 0.163 | 0.104 | 0.201 | 0.180 | 0.157 | 0.215 | 0.210 | 0.199 |
| $AR$ | 0.183 | 0.147 | 0.109 | 0.204 | 0.174 | 0.156 | 0.221 | 0.203 | 0.188 |
| $CR_5$ | 1.315 | 0.986 | 0.674 | 1.533 | 1.230 | 1.063 | 1.716 | 1.523 | 1.365 |
| $SAAR$ | 0.005 | −0.011 | −0.037 | 0.033 | 0.013 | 0.002 | 0.040 | 0.034 | 0.017 |

**Table II**—*Continued*

### Panel C: $B/M$ and $GS$

| | Glamour | | | | | | Value | | |
|---|---|---|---|---|---|---|---|---|---|
| $B/M$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $R_1$ | 0.147 | 0.141 | 0.132 | 0.160 | 0.159 | 0.121 | 0.204 | 0.185 | 0.135 |
| $R_2$ | 0.127 | 0.138 | 0.127 | 0.175 | 0.166 | 0.150 | 0.200 | 0.172 | 0.163 |
| $R_3$ | 0.149 | 0.149 | 0.137 | 0.190 | 0.186 | 0.152 | 0.221 | 0.192 | 0.182 |
| $R_4$ | 0.147 | 0.130 | 0.130 | 0.191 | 0.176 | 0.154 | 0.222 | 0.190 | 0.195 |
| $R_5$ | 0.158 | 0.140 | 0.124 | 0.203 | 0.180 | 0.165 | 0.216 | 0.211 | 0.164 |
| $AR$ | 0.146 | 0.140 | 0.130 | 0.184 | 0.173 | 0.148 | 0.212 | 0.190 | 0.168 |
| $CR_5$ | 0.974 | 0.925 | 0.842 | 1.325 | 1.224 | 0.996 | 1.618 | 1.387 | 1.171 |
| $SAAR$ | −0.009 | −0.012 | −0.021 | 0.022 | 0.015 | −0.009 | 0.039 | 0.030 | 0.017 |

### Panel D: $E/P$ and $B/M$

| | Glamour | | | | | | | | Value |
|---|---|---|---|---|---|---|---|---|---|
| $E/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $B/M$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $R_1$ | 0.116 | 0.118 | 0.186 | 0.142 | 0.143 | 0.174 | 0.135 | 0.174 | 0.189 |
| $R_2$ | 0.086 | 0.120 | 0.194 | 0.146 | 0.163 | 0.192 | 0.173 | 0.178 | 0.185 |
| $R_3$ | 0.114 | 0.154 | 0.201 | 0.157 | 0.184 | 0.220 | 0.177 | 0.178 | 0.204 |
| $R_4$ | 0.093 | 0.151 | 0.218 | 0.150 | 0.166 | 0.193 | 0.188 | 0.200 | 0.214 |
| $R_5$ | 0.093 | 0.188 | 0.218 | 0.168 | 0.169 | 0.209 | 0.241 | 0.205 | 0.204 |
| $AR$ | 0.100 | 0.146 | 0.203 | 0.152 | 0.165 | 0.198 | 0.183 | 0.187 | 0.199 |
| $CR_5$ | 0.613 | 0.976 | 1.521 | 1.032 | 1.146 | 1.464 | 1.311 | 1.354 | 1.479 |
| $SAAR$ | −0.039 | −0.009 | 0.022 | 0.002 | 0.009 | 0.033 | 0.003 | 0.023 | 0.030 |

### Panel E: $B/M$ and $C/P$

| | Glamour | | | | | | | | Value |
|---|---|---|---|---|---|---|---|---|---|
| $B/M$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $C/P$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $R_1$ | 0.111 | 0.153 | 0.141 | 0.101 | 0.144 | 0.171 | 0.170 | 0.161 | 0.194 |
| $R_2$ | 0.085 | 0.164 | 0.172 | 0.111 | 0.160 | 0.181 | 0.174 | 0.173 | 0.189 |
| $R_3$ | 0.111 | 0.172 | 0.179 | 0.147 | 0.177 | 0.191 | 0.192 | 0.206 | 0.207 |
| $R_4$ | 0.101 | 0.153 | 0.187 | 0.155 | 0.168 | 0.200 | 0.177 | 0.195 | 0.219 |
| $R_5$ | 0.108 | 0.162 | 0.250 | 0.184 | 0.178 | 0.208 | 0.233 | 0.201 | 0.209 |
| $AR$ | 0.103 | 0.161 | 0.186 | 0.139 | 0.165 | 0.190 | 0.189 | 0.187 | 0.203 |
| $CR_5$ | 0.633 | 1.108 | 1.339 | 0.917 | 1.148 | 1.387 | 1.378 | 1.355 | 1.524 |
| $SAAR$ | −0.037 | 0.007 | 0.018 | −0.021 | 0.011 | 0.026 | 0.006 | 0.020 | 0.037 |

from the two classifications. Because the classifications are done independently, extreme glamour (high $GS$, low $C/P$) and value portfolios (low $GS$, high $C/P$) contain greater than average numbers of stocks, since $GS$ and $C/P$ are negatively correlated.

In an average postformation year in this sample, the glamour portfolio had a return of 11.4 percent, and the value portfolio had a return of 22.1 percent, for a difference of 10.7 percent per year. Over the 5 postformation years, the cumulative difference in returns is 100 percent. On a size-adjusted basis, the difference in returns is 8.7 percent per year. As Figure 1 illustrates, both $C/P$ and $GS$ contribute a great deal of explanatory power in these bivariate classifications. For example, low $C/P$ stocks with low past sales growth, which we don't define as glamour stocks, have an average annual future return of 16.2 percent, but low $C/P$ stocks with a high past sales growth, which we do define as glamour stocks, have an average annual future return of only 11.4 percent.

Table II, Panel B presents the return results for a classification scheme using both past $GS$ and the $E/P$ ratio. The average annual difference in returns over the 5-year period between the two extreme portfolios is 11.2 percent per year, which cumulatively amounts to 104.2 percent over 5 years. As with $C/P$ and $GS$, the $(E/P, GS)$ strategy produces substantially higher returns than either the $E/P$ or the $GS$ strategy alone. For example, among firms with the lowest $E/P$ ratios, the average annual future return varies from 10.9 percent for firms with the highest past sales growth to 18.3 percent for those with the lowest past sales growth. Even more so than for $C/P$, using an $E/P$ strategy seems to require differentiating between the stocks
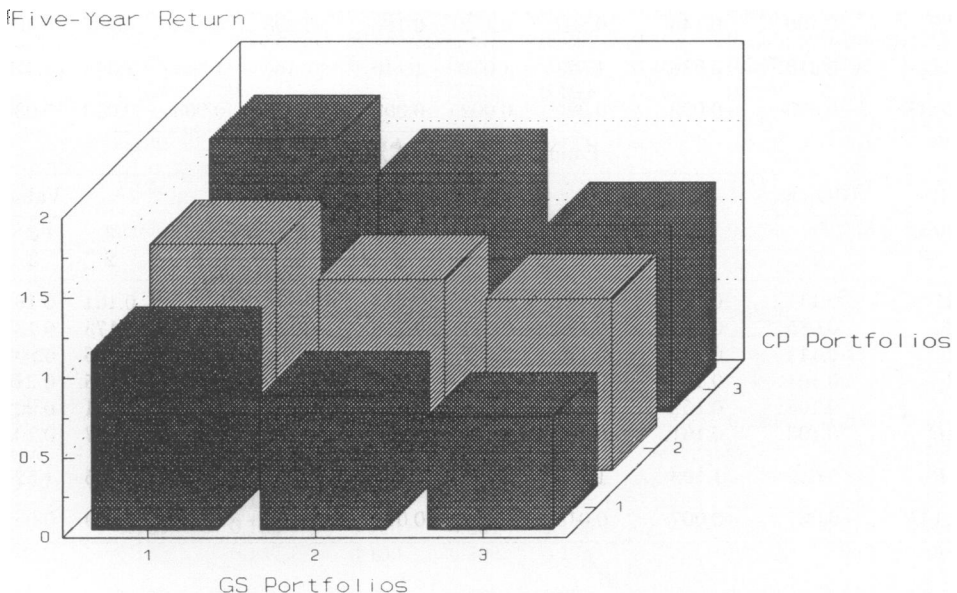


**Figure 1. Compounded 5-year return for portfolios formed on the basis of $C/P$ and $GS$.** At the end of each April between 1968 and 1989, 9 groups of stocks are formed. The stocks are independently sorted in ascending order into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) based on each of two variables: cash-flow-to-price $(C/P)$ and growth-in-sales $(GS)$. Returns presented are compounded 5-year postformation returns assuming annual rebalancing for these 9 portfolios.

with depressed earnings expected to recover and the true glamour firms.[10]
Once this finer classification scheme is used, the two-dimensional strategy
based on $E/P$ generates returns as high as those produced by the two-
dimensional strategy based on $C/P$.

Table II, Panel C presents results for portfolios classified by $B/M$ and $GS$.
The results show that $GS$ has significant explanatory power for returns even
after sorting by $B/M$. For example, within the set of firms whose $B/M$ ratios
are the highest, the average difference in returns between the low sales
growth and high sales growth subgroups is over 4 percent per year (21.2
versus 16.8 percent). A similar result holds for the other two groups sorted by
$B/M$. Note that these results do not appear to be driven by the role of the
superimposed $GS$ classification in creating a more precise partition of the
firms by $B/M$. The $B/M$ ratios across $GS$ subgroups are not very different.

Panels D and E of Table II present results for $(B/M, E/P)$ and
$(B/M, C/P)$, respectively. Once again, the results confirm the usefulness of
more precise classification schemes. For example, among firms with the
lowest $C/P$ ratios, future returns vary substantially according to $B/M$
ratios. Future returns vary from 10.3 percent per year for the true glamour
firms, to 18.6 percent per year for firms with low ratios of $C/P$ but high
$B/M$ ratios. Most likely, the $B/M$ ratio adds information here because it
proxies for past growth, which is useful in conjunction with a measure of
expected future growth.

The results of this subsection can be summarized and interpreted as
follows. First, two-dimensional value strategies, in which firms are indepen-
dently classified into 3 subgroups according to each of two fundamental
variables, produce returns on the order of 10 to 11 percent per year higher
than those on similarly constructed glamour strategies over the April 1968 to
April 1990 period. Second, the results suggest that value strategies based
jointly on past performance and expected future performance produce higher
returns than more ad hoc strategies such as that based exclusively on the
$B/M$ ratio.

## B. Do These Results Apply As Well to Large Stocks?

Even though we have shown that the superior returns to value strategies
persist even after adjusting for size, the returns on such strategies might still
be driven by the smaller stocks. Larger firms are of greater interest for
implementable trading strategies, especially for institutional investors. Larger
firms are also more closely monitored, and hence might be more efficiently
priced. Finally, the look-ahead and survivorship biases discussed by Banz
and Breen (1986) and Kothari, Shanken, and Sloan (1992) should be less
important for the larger stocks.

Table III presents a summary version of Table II for the subsample
consisting of the largest 50 percent of our NYSE/AMEX firms. The results

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[10] This probably results from the greater year-to-year percentage swings for earnings than for
cash flows.

are similar to those obtained for the whole sample. For example, using the $(C/P, GS)$ classification scheme, the difference in average annual size-adjusted returns between the value and glamour portfolios is 8.7 percent, exactly the same as for the entire sample. Using the $(E/P, GS)$ classification

## Table III

### Returns for Portfolios Based on Two-Dimensional Classifications for the Largest 50 Percent of Stocks

At the end of each April between 1968 and 1989, 9 subgroups of the largest 50 percent of stocks by market capitalization are formed. The stocks are independently sorted in ascending order into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) based on each of two variables. The sorts are for 5 pairs of variables: $C/P$ and $GS$, $B/M$ and $GS$, $E/P$ and $GS$, $E/P$ and $B/M$, and $B/M$ and $C/P$. $C/P$ is the ratio of cash flow to market value of equity; $B/M$ is the ratio of book value of equity to market value of equity; $E/P$ is the ratio of earnings to market value of equity; and $GS$ refers to preformation 5-year average growth rate of sales. The returns presented in the table are averages over all formation periods. $AR$ is the average annual return over 5 postformation years. $CR_5$ is the compounded 5-year return assuming annual rebalancing. $SAAR$ is the average annual size-adjusted abnormal return computed over 5 postformation years. Depending on the two variables being used for classification, the value portfolio either refers to the portfolio containing stocks ranked in the top group (3) on both variables from among $C/P$, $E/P$, or $B/M$, or else the portfolio containing stocks ranking in the top group on one of those variables and in the bottom group (1) on $GS$. The glamour portfolio contains stocks with precisely the opposite set of rankings.

| Panel A: $C/P$ and $GS$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Glamour | | | | Value | |
| $C/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $AR$ | 0.159 | 0.125 | 0.106 | 0.178 | 0.161 | 0.153 | 0.184 | 0.174 | 0.141 |
| $CR_5$ | 1.094 | 0.799 | 0.654 | 1.270 | 1.106 | 1.040 | 1.328 | 1.226 | 0.934 |
| $SAAR$ | 0.001 | −0.020 | −0.039 | 0.030 | 0.010 | 0.001 | 0.048 | 0.021 | −0.010 |

| Panel B: $E/P$ and $GS$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Glamour | | | | Value | |
| $E/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $AR$ | 0.168 | 0.136 | 0.103 | 0.182 | 0.163 | 0.148 | 0.186 | 0.181 | 0.163 |
| $CR_5$ | 1.176 | 0.894 | 0.631 | 1.307 | 1.126 | 0.997 | 1.344 | 1.301 | 1.124 |
| $SAAR$ | 0.012 | −0.011 | −0.037 | 0.034 | 0.012 | −0.002 | 0.046 | 0.031 | 0.007 |

| Panel C: $B/M$ and $GS$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Glamour | | | | Value | |
| $B/M$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $AR$ | 0.149 | 0.140 | 0.124 | 0.176 | 0.158 | 0.131 | 0.186 | 0.172 | 0.153 |
| $CR_5$ | 1.001 | 0.922 | 0.793 | 1.248 | 1.080 | 0.849 | 1.347 | 1.211 | 1.039 |
| $SAAR$ | 0.000 | −0.008 | −0.025 | 0.027 | 0.006 | −0.020 | 0.043 | 0.022 | 0.005 |

**Table III**—*Continued*

| | | | Panel D: $E/P$ and $B/M$ | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Glamour | | | | | | | | Value |
| $E/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $B/M$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $AR$ | 0.104 | 0.146 | 0.185 | 0.156 | 0.155 | 0.178 | 0.184 | 0.170 | 0.175 |
| $CR_5$ | 0.636 | 0.979 | 1.335 | 1.063 | 1.054 | 1.265 | 1.318 | 1.190 | 1.244 |
| $SAAR$ | −0.035 | 0.000 | 0.028 | 0.006 | 0.006 | 0.037 | 0.014 | 0.021 | 0.031 |

| | | | Panel E: $B/M$ and $C/P$ | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Glamour | | | | | | | | Value |
| $B/M$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| $C/P$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| $AR$ | 0.109 | 0.166 | 0.148 | 0.139 | 0.157 | 0.168 | 0.182 | 0.173 | 0.178 |
| $CR_5$ | 0.675 | 1.152 | 0.991 | 0.909 | 1.074 | 1.175 | 1.301 | 1.222 | 1.264 |
| $SAAR$ | −0.031 | 0.015 | −0.007 | −0.011 | 0.010 | 0.019 | 0.028 | 0.029 | 0.037 |

scheme, this difference is 8.3 percent per year, compared to 7.7 percent per year for the entire sample. Raw return differences between value and glamour portfolios are slightly lower for the large-firm subsample because the extra return to value firms from their smaller average size is not present in that subsample. Value and glamour firms are essentially the same size in the large firm subsample. We have also done the analysis for the largest 20 percent of the stocks, which effectively mimics the S&P 500, and get a very similar spread of returns between glamour and value stocks. The conclusion is clear: our results apply to the largest stocks as well.

## C. Regression Analysis

Previous analysis has identified a variety of variables that can define glamour and value portfolios. In this section, we ask which of these variables are significant in a multiple regression. Table IV presents the results of regressions of raw returns for each stock on the characteristics of stocks that we have identified. Recall that in our analysis we have 22 portfolio formation periods. We run regressions separately for each postformation year, starting with +1 and ending with +5. Thus, for postformation Year +1, we run 22 separate cross-sectional regressions in which the dependent variable is the annual return on stock $i$ and the independent variables are characteristics of stock $i$ observed at the beginning of the year. Then, using the Fama-MacBeth (1973) procedure, the coefficients for these 22 cross-sectional regressions are averaged and the $t$-statistics are computed. We applied the same procedure for Years +2, +3, +4, and +5 after the formation. The results presented in Table IV are for the Year +1.

<div align="center">

**Table IV**

**Regression of Returns on Characteristics for All Firms**
</div>

At the end of each April between 1968 and 1989, we compute for every firm in the sample the 1-year holding-period return starting at the end of April. We then run 22 cross-sectional regressions with these returns for each formation period as dependent variables. The independent variables are (1) $GS$, the preformation 5-year weighted average rank of sales growth; (2) $B/M$, the ratio of end of previous year's book value of equity to market value of equity; (3) $SIZE$, the end of April natural logarithm of market value of equity (in millions); (4) $E/P+$, equal to $E/P$—the ratio of previous year's earnings to end-of-April market value of equity—if $E/P$ is positive—and to zero if $E/P$ is negative; (5) $DE/P$, equal to 1 if $E/P$ is negative, and zero if $E/P$ is positive; (6) $C/P+$, equal to $C/P$—the ratio of previous-year's cash flow to end-of-April market value of equity—if $C/P$ is positive—and zero if $C/P$ is negative; (7) $DC/P$, equal to 1 if $C/P$ is negative, and zero if $C/P$ is positive. The reported coefficients are averages over the 22 formation periods. The reported $t$-statistics are based on the time-series variation of the 22 coefficients.

|  | Int. | GS | B/M | SIZE | E/P+ | DE/P | C/P+ | DC/P |
|---|---|---|---|---|---|---|---|---|
| Mean | 0.180 | −0.061 |  |  |  |  |  |  |
| $t$-statistic | 3.251 | −2.200 |  |  |  |  |  |  |
| Mean | 0.108 |  | 0.039 |  |  |  |  |  |
| $t$-statistic | 2.167 |  | 2.132 |  |  |  |  |  |
| Mean | 0.185 |  |  | −0.009 |  |  |  |  |
| $t$-statistic | 2.140 |  |  | −1.095 |  |  |  |  |
| Mean | 0.110 |  |  |  | 0.526 |  |  |  |
| $t$-statistic | 2.029 |  |  |  | 2.541 |  |  |  |
| Mean | 0.099 |  |  |  |  |  | 0.356 |  |
| $t$-statistic | 1.873 |  |  |  |  |  | 4.240 |  |
| Mean | 0.129 | −0.058 | 0.006 |  |  |  | 0.301 | −0.029 |
| $t$-statistic | 2.584 | −2.832 | 0.330 |  |  |  | 3.697 | −1.222 |
| Mean | 0.143 |  | 0.009 | −0.009 |  |  | 0.280 | −0.032 |
| $t$-statistic | 1.562 |  | 0.565 | −1.148 |  |  | 4.223 | −1.625 |
| Mean | 0.169 | −0.044 | 0.000 | −0.009 |  |  | 0.296 | −0.036 |
| $t$-statistic | 1.947 | −2.125 | 0.005 | −1.062 |  |  | 4.553 | −1.625 |
| Mean | 0.172 | −0.051 | 0.016 | −0.009 | 0.394 | −0.032 |  |  |
| $t$-statistic | 1.961 | −2.527 | 1.036 | −1.065 | 2.008 | −1.940 |  |  |

We use the ratios of $C/P$ and of $E/P$ in the regression analysis. However, for some stocks these ratios are negative, and hence cannot be plausibly interpreted as expected growth rates. We deal with this problem in the same way as Fama and French (1992). Specifically, we define variables $C/P+$ and $E/P+$, which are equal to zero when $C/P$ and $E/P$ are negative, and are equal to $C/P$ and $E/P$ when they are positive. We also include in the regressions dummy variables, called $DC/P$ and $DE/P$, which take the value of 1 when $C/P$ or $E/P$ are negative, respectively, and zero otherwise. This approach enables us to treat observations with negative $E/P$ and $C/P$ differently from observations with positive $E/P$ and $C/P$.

The first result emerging from Table IV is that, taken separately, each of $GS$, $B/M$, $E/P$, and $C/P$, although not $SIZE$, have statistically significant predictive power for returns. These results are in line with Fama and French (1992), although on a stand-alone basis $C/P$ and not $B/M$ is the most significant variable. When we use the dependent variables in combination, the weakness of $B/M$ relative to $C/P$, $E/P$, and $GS$ begins to emerge, and its coefficient drops significantly. For example, when $GS$, $C/P$, and $B/M$ are included in the same regression, the first two are significant, but $B/M$ is not. In fact, the coefficient on $B/M$ is essentially zero. Similarly, when $GS$, $E/P$, and $B/M$ are included in the same regression, $E/P$ and $GS$ are significant, but $B/M$ is not. The variables that stand out in the multiple regressions are $GS$ and $C/P$.

## IV. A Test of the Extrapolation Model

So far we have shown that strategies contrarian to extrapolation earn high abnormal returns relative to the market and to extrapolation strategies. We have not, however, provided any direct evidence that excessive extrapolation and expectational errors are indeed what characterizes glamour and value stocks.[11] In this section, we provide such evidence. The essence of extrapolation is that investors are excessively optimistic about glamour stocks and excessively pessimistic about value stocks because they tie their expectations of future growth to past growth. But if investors make mistakes, these mistakes can presumably be detected in the data. A direct test of extrapolation, then, is to look directly at *actual* future growth rates and compare them to *past* growth rates and to *expected* growth rates as implied by the multiples.

Table V presents some descriptive characteristics for our glamour and value portfolios regarding their valuation multiples, past growth rates, and future growth rates. Panel A reveals that the value portfolios had much higher ratios of fundamentals to price.[12] We interpret these ratios in terms of lower expected growth rates for value stocks. Panel B shows that, using several measures of past growth, including earnings, cash flow, sales, and stock return, glamour stocks grew substantially faster than value stocks over the 5 years before portfolio formation. Finally, Panel C shows that over the 5 postformation years the relative growth of fundamentals for glamour stocks was much less impressive. Indeed, over Years $+2$ to $+5$ relative to formation the growth rates of fundamentals for the value portfolio were often higher. This deterioration of relative growth rates of glamour stocks compared to

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[11] In their study of contrarian strategies based on past stock returns, De Bondt and Thaler (1987) provide some evidence for the expectational errors view.

[12] The one exception is for the $E/P$ ratio using the $B/M$ classification scheme. Apparently, because of the large number of stocks with temporarily depressed earnings in the highest $B/M$ decile, the $E/P$ ratio for this group is extremely low. This result goes away when looking at the top two deciles together or when looking at the top decile within the largest 50 percent of our firms.

Table V

## Fundamental Variables, Past Performance, and Future Performance of Glamour and Value Stocks

Panel 1: At the end of each April between 1968 and 1989, 10-decile portfolios are formed based on the ratio of end-of-previous-year's book value of equity to end-of-April market value of equity. Numbers are presented for the first (lowest $B/M$) and tenth (highest $B/M$) deciles. These portfolios are denoted Glamour and Value, respectively.

Panel 2: At the end of each April between 1968 and 1989, 9 groups of stocks are formed. The stocks are independently sorted in ascending order into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, (3) top 30 percent) based on $C/P$, the ratio of cash flow to market value of equity, and $GS$, the preformation 5-year weighted average sales growth rank. Numbers are presented for $(C/P_1, GS_3)$, the bottom 30 percent by $C/P$ and the top 30 percent by $GS$, and for $(C/P_3, GS_1)$ the top 30 percent by $C/P$ and the bottom 30 percent by $GS$. These portfolios are denoted Glamour and Value, respectively.

All numbers in the table are averages over all formation periods.

$E/P$, $C/P$, $S/P$, $D/P$, $B/M$, and $SIZE$, defined below, use the end-of-April market value of equity and preformation year accounting numbers. $E/P$ is the ratio of earnings to market value of equity. $S/P$ is the ratio of sales to market value of equity. $D/P$ is the ratio of dividends to market value of equity. $B/M$ is the ratio of book value to market value of equity. $SIZE$ is the total dollar value of equity (in millions). $AEG_{(i,j)}$ is the geometric average growth rate of earnings for the portfolio from year $i$ to year $j$. $ACG_{(i,j)}$ and $ASG_{(i,j)}$ are defined analogously for cash flow and sales, respectively. $RETURN_{(-3,0)}$ is the cumulative stock return on the portfolio over the 3 years prior to formation.

| | Panel 1 | | Panel 2 | |
| --- | --- | --- | --- | --- |
| | Glamour $B/M_1$ | Value $B/M_{10}$ | Glamour $C/P_1, GS_3$ | Value $C/P_3, GS_1$ |
| Panel A: Fundamental Variables | | | | |
| $E/P$ | 0.029 | 0.004 | 0.054 | 0.114 |
| $C/P$ | 0.059 | 0.172 | 0.080 | 0.279 |
| $S/P$ | 0.993 | 6.849 | 1.115 | 5.279 |
| $D/P$ | 0.012 | 0.032 | 0.014 | 0.039 |
| $B/M$ | 0.225 | 1.998 | 0.385 | 1.414 |
| $SIZE$ | 663 | 120 | 681 | 390 |
| Panel B: Past Performance—Growth Rates and Past Returns | | | | |
| $AEG_{(-5,0)}$ | 0.309 | -0.274 | 0.142 | 0.082 |
| $ACG_{(-5,0)}$ | 0.217 | -0.013 | 0.210 | 0.078 |
| $ASG_{(-5,0)}$ | 0.091 | 0.030 | 0.112 | 0.013 |
| $RETURN_{(-3,0)}$ | 1.455 | -0.119 | 1.390 | 0.225 |
| Panel C: Future Performance | | | | |
| $AEG_{(0,5)}$ | 0.050 | 0.436 | 0.089 | 0.086 |
| $ACG_{(0,5)}$ | 0.127 | 0.070 | 0.112 | 0.052 |
| $ASG_{(0,5)}$ | 0.062 | 0.020 | 0.100 | 0.037 |
| $AEG_{(2,5)}$ | 0.070 | 0.215 | 0.084 | 0.147 |
| $ACG_{(2,5)}$ | 0.086 | 0.111 | 0.095 | 0.088 |
| $ASG_{(2,5)}$ | 0.059 | 0.023 | 0.082 | 0.038 |

past relative growth and expected future relative growth is explored more systematically below.

To interpret differences in financial ratios such as $C/P$ and $E/P$ in terms of expected growth rates, we come back to Gordon's formula (Gordon and Shapiro (1956)). Recall that for cash flow, this formula can be rewritten as $\rho C(+1)/P = r - g$, where $C(+1)$ is one period ahead cash flow, $P$ is the current stock price, $r$ is the required rate of return on the stock, $g$ is the expected growth rate of cash flow, and $\rho$, the payout ratio for cash flows, is the constant fraction of cash flows received as dividends. An identical formula applies for earnings, under the assumption that dividends are also some fixed fraction of earnings. Taken literally, these formulas imply that, holding discount rates and payout ratios constant, we can directly calculate differences in expected growth rates based on differences in $C/P$ or $E/P$ ratios. Because the assumptions behind these simple formulas are restrictive (e.g., constant growth rates, strict proportionality of dividends, cash flows and earnings, identical payout ratios across stocks, etc.), we do not calculate exact estimates of differences in expected growth rates between value and glamour portfolios. Instead, we choose to analyze differences in past growth, valuation multiples and future growth rates in a way that is more robust with respect to departures from these assumptions. However, the idea behind this analysis is the same. We ask whether the large differences in $C/P$ and $E/P$ ratios between value and glamour stocks can be justified by differences in future growth rates.

We start with the data for portfolios classified according to $(C/P, GS)$. As we know already, the past growth of glamour stocks by any measure was much faster than that of value stocks. For example, over the 5 years before portfolio formation, the annual growth rate of cash flow for the glamour portfolio was 21.0 percent compared to 7.8 percent for the value portfolio. The difference in cash flow multiples between the value and glamour portfolios suggests that the market was expecting these growth differences to persist for many years. A dollar invested in the value portfolio was a claim to 27.9 cents in a current cash flow while a dollar invested in the glamour portfolio was a claim to only 8 cents of current cash flow. Ignoring any differences in required rates of return (this possibility is examined in Section V), these large differences in $C/P$ would have to be justified either by big differences in payout ratios between value and glamour firms or else by an expectation of very different growth rates over a long period of time. A quick look at the respective dividend yields on the value and glamour portfolios suggests that the difference was not due to differences in payout ratios. A dollar invested in the value portfolio was a claim to 3.9 cents in current dividends, while a dollar invested in the glamour portfolio brought in only 1.4 cents in dividends. These differ by roughly the same factor of 3 as for $C/P$. While the cash flow payout ratios were slightly higher for glamour stocks (0.175 versus 0.140),[13] this does not account for most of the difference in $C/P$.

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[13] We estimate these payout ratios by dividing $D/P$ by $C/P$.

Under the assumption that payout ratios and discount rates were approximately equal, at some future date the expected cash flows per current dollar invested must have been higher for the glamour portfolio than for the value portfolio. Accordingly, we can ask how many years it would take for the cash flows per dollar invested in the glamour portfolio (0.080) to equal the cash flows of the value portfolio (0.279), assuming that the differences in past cash flow growth rates persisted (i.e., 21.0 versus 7.8 percent). The answer turns out to be approximately 11 years. If we do the same calculations using $D/P$ ratios to take account of differences in payout ratios, it would have taken approximately 9 years for dividends per dollar invested in the glamour portfolio (currently 0.014) to catch up to those of the value portfolio (currently 0.039), assuming that past growth rate differences persisted. Note that this equality is on a flow basis not on a present-value basis. Equality on a present-value basis would require an even longer time period over which glamour firms should experience superior growth.

We can now compare these implied growth expectations to the actual cash flow growth experienced by the glamour and value portfolios. Over the first 5 years after formation, the cash flows of the glamour portfolio grew by 11.2 percent per year versus 5.2 percent for the value portfolio. Hence, cash flow per dollar invested grew from 0.080 initially to 0.136 at the end of Year 5, while for the value portfolio cash flow per dollar invested grew from 0.279 to 0.360, still leaving a large gap in cash flow returns between the two portfolios in Year 5. More importantly, the superior postformation growth is driven almost entirely by higher growth in the first 1 to 2 postformation years. From Year $+2$ to $+5$ postformation, the annual cash flow growth rates were 9.5 and 8.8 percent for glamour and value, respectively. While the market correctly anticipated higher growth in the very short-term, the persistence of these higher growth rates seems to have been grossly overestimated.[14] If growth rates after Year 5 were comparable to growth rates observed over Years $+2$ to $+5$, then, after 10 years, cash flows per dollar on the glamour portfolio would be only 0.214 compared to 0.549 for value. These data are consistent with the idea that the market was too optimistic about the future growth of glamour firms relative to value firms.

A similar conclusion emerges from an analysis of earnings numbers. Over the 5 years before portfolio formation, the growth rate of earnings per dollar invested for the glamour portfolio was 14.2 percent versus 8.2 percent for the value portfolio. At formation, the $E/P$ ratio for glamour was 0.054 compared to 0.114 for value. This difference in $E/P$ ratios does not appear to be driven by differences in earnings payout ratios since the payout ratio for value was actually somewhat higher than for glamour (0.34 versus 0.26). Once again, we can examine the postformation growth rates to see whether higher postformation growth for glamour could justify its lower initial $E/P$ ratio. Here the numbers are even more dramatic than for cash flow. Over the 5 postforma-

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[14] The result that growth rates of earnings are highly mean reverting is not new. Little (1962) shows this quite clearly in his pathbreaking article.

tion years, cumulative growth in earnings per dollar of initial investment was almost identical for the two portfolios. Earnings growth averaged 8.9 percent per year for glamour versus 8.6 percent per year for value. While growth in the first 1 to 2 years was higher for glamour, this was reversed over the following 3 years. If investors expected the superior growth of glamour firms to persist (as suggested by the differences in $E/P$ ratios), the data indicate that they significantly overestimated future growth rate differences between glamour and value stocks.

Analogous results for portfolios classified according to $B/M$ are also presented in Table V. We focus only on the numbers for cash flow because the $E/P$ ratios for the extreme decile portfolios are so low as to make an expected growth computation somewhat questionable. For example, the $E/P$ ratio for decile 10 (value) was only 0.004, indicating a high proportion of firms with temporarily depressed earnings. Because cash flows are less volatile and less often negative, the $C/P$ ratios are much better behaved. For the glamour portfolio ($B/M_1$), $C/P$ was equal to 0.059 versus 0.172 for the value portfolio ($B/M_{10}$). These numbers are quite similar to those for the ($C/P, GS$) portfolios.

Presumably, this difference in $C/P$ reflects, at least in part, the market's expectation that the superior growth of glamour firms would continue. Over the previous 5 years cash flow for the glamour portfolio had grown at 21.7 percent per year while cash flow growth for the value portfolio had been $-1.3$ percent per year. Estimated cash flow payout ratios for glamour and value firms were quite similar (0.203 and 0.186, respectively). Hence, differential payout ratios alone could not justify much of the difference in $C/P$ ratios.

Postformation cash flow numbers indicate that glamour stocks indeed outgrew value stocks over the 5 years after formation, but that this is due to much higher growth at the beginning of the postformation period. In the last 3 years of the postformation period, cash flows for the value portfolio actually grew faster (11.1 percent per year versus 8.6 percent per year). In sum, at the end of 5 years cash flow per initial dollar invested rose from 0.059 to 0.107 for the glamour portfolio and from 0.172 to 0.241 for the value portfolio. If cash flow growth rates over Years $+2$ to $+5$ postformation were any indication of growth rates after Year 5, the cash flow return on glamour stocks did not get any closer to that for value stocks. These results mirror those for the ($C/P, GS$) classification. They are consistent with the view that the superior postformation return on value stocks are explained by upward revisions in expectations about the relative growth rates of value versus glamour stocks.

Contrary to the assertions of Fama and French (1993, Section V), the market was likely to learn about its mistake only slowly over time since its expectation of higher relative growth for individual glamour firms was often confirmed in the short-run but then disconfirmed only in the longer run. Hence, we do not necessarily expect to see a clear spike in returns or $E/P$ ratios. In this respect, the motivation behind the contrarian strategies explored in this article is quite different from that for the strategies explored by Jegadeesh and Titman (1993), Bernard and Thomas (1989), and Givoly and

Lakonishok (1979). The momentum-based strategies of those articles rely on the market's short-term failure to recognize a trend. In contrast, the superior returns to value strategies documented here seem to be driven by the market's unwarranted belief in the continuation of a long-term trend and its gradual abandonment of that belief.

In summary, the evidence in Table V is consistent with the extrapolation model. Glamour stocks have historically grown fast in sales, earnings, and cash flow relative to value stocks. According to most of our measures, the market expected the superior growth of glamour firms to continue for many years. In the very short-run, the expectations of continued superior growth of glamour stocks were on average born out. However, beyond the first couple years, growth rates of glamour stocks and value stocks were essentially the same. The evidence suggests that forecasts were tied to past growth rates and were too optimistic for glamour stocks relative to value stocks. This is precisely what the extrapolation model would predict. In this respect, the evidence in Table V goes beyond the customary evidence on returns in that it shows a relationship between the past, the forecasted, and the actual future growth rates that is largely consistent with the predictions of the extrapolation model.

## V. Are Contrarian Strategies Riskier?

Two alternative theories have been proposed to explain why value strategies have produced higher returns in the past. The first theory says that they have done so because they exploit the mistakes of naive investors. The previous section showed that investors appear to be extrapolating the past too far into the future, even though the future does not warrant such extrapolation. The second explanation of the superior returns to value strategies is that they expose investors to greater systematic risk. In this section, we examine this explanation directly.

Value stocks would be fundamentally riskier than glamour stocks if, first, they underperform glamour stocks in some states of the world, and second, those are on average "bad" states, in which the marginal utility of wealth is high, making value stocks unattractive to risk-averse investors. This simple theory motivates our empirical approach.

To begin, we look at the consistency of performance of the value and glamour strategies over time and ask how often value underperforms glamour. We then check whether the times when value underperforms are recessions, times of severe market declines, or otherwise "bad" states of the world in which the marginal utility of consumption is high. These tests do not provide much support for the view that value strategies are fundamentally riskier. Finally, we look at some traditional measures of risk, such as beta and the standard deviation of returns, to compare value and glamour strategies.

Table VI and Figure 2 present the year-by-year performance of the value strategy *relative* to the glamour strategy over the April 1968 to April 1990

Table VI

**Year-by-Year Returns: Value—Glamour**

Panel 1: At the end of each April between 1968 and 1989, 10-decile portfolios are formed based on the ratio of previous-year's cash flow to end-of-April market-value of equity $(C/P)$. For each portfolio, 1-, 3-, and 5-year holding-period returns are computed. For each formation period, Panel 1 reports the difference in the 1-, 3-, and 5-year return between the 2 highest $C/P$ (value) and 2 lowest $C/P$ (glamour) portfolios.

Panel 2: At the end of each April between 1968 and 1989, 9 groups of stocks are formed as follows. All stocks are independently sorted into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) by the ratio of previous-year's cash flow to end-of-April market-value of equity $(C/P)$ and by the preformation 5-year weighted average rank-of-sales growth $(GS)$. The 9 portfolios are intersections resulting from these 2 independent classifications. For each portfolio, 1-, 3-, and 5-year holding period returns are computed. For each formation period, Panel 2 reports the difference in the 1-, 3-, and 5-year return between the lowest $GS$, highest $C/P$ (value) and the highest $GS$, lowest $C/P$ (glamour) portfolios.

Panel 3: At the end of each April between 1968 and 1989, 10-decile portfolios are formed based on the ratio of end-of-previous-year's book value of equity to end-of-April market value of equity $(B/M)$. For each portfolio, 1-, 3-, and 5-year-holding-period returns are computed. For each formation period, Panel 3 reports the difference in the 1-, 3-, and 5-year return between the highest $B/M$ (value) and lowest $B/M$ (glamour) decile portfolios.

The last two rows respectively report the arithmetic mean across periods and the $t$-statistic for the test of the hypothesis that the difference in returns between value and glamour is equal to zero. These $t$-statistics are based on standard errors computed according to Hansen and Hodrick (1980).

| | Panel 1 | | | Panel 2 | | | Panel 3 | | |
| | $(C/P: 9, 10 - 1, 2)$ | | | $(C/P\text{-}GS: 3, 1 - 1, 3)$ | | | $(B/M: 9, 10 - 1, 2)$ | | |
| | 1-Year | 3-Year | 5-Year | 1-Year | 3-Year | 5-Year | 1-Year | 3-Year | 5-Year |
|---|---|---|---|---|---|---|---|---|---|
| 1968 | 0.022 | 0.287 | 0.474 | 0.144 | 0.153 | 0.267 | 0.098 | 0.201 | 0.344 |
| 1969 | 0.123 | 0.195 | 0.410 | 0.065 | −0.143 | 0.283 | 0.074 | 0.070 | 0.303 |
| 1970 | 0.135 | 0.246 | 0.428 | 0.002 | 0.160 | 0.356 | 0.023 | 0.032 | 0.279 |
| 1971 | −0.078 | 0.231 | 0.478 | −0.144 | 0.196 | 0.531 | −0.108 | 0.156 | 0.463 |
| 1972 | 0.155 | 0.319 | 0.693 | 0.134 | 0.362 | 0.932 | 0.098 | 0.328 | 0.784 |
| 1973 | 0.021 | 0.382 | 0.846 | 0.152 | 0.702 | 1.416 | 0.042 | 0.450 | 0.925 |
| 1974 | −0.007 | 0.496 | 1.343 | 0.069 | 0.650 | 1.597 | 0.050 | 0.642 | 1.726 |
| 1975 | 0.262 | 0.816 | 1.310 | 0.379 | 1.115 | 1.229 | 0.418 | 1.034 | 1.182 |
| 1976 | 0.174 | 0.673 | 1.468 | 0.217 | 0.715 | 1.235 | 0.132 | 0.727 | 0.993 |
| 1977 | 0.193 | 0.247 | 0.764 | 0.219 | 0.149 | 0.844 | 0.195 | 0.181 | 0.614 |
| 1978 | 0.048 | −0.106 | 0.272 | 0.039 | −0.072 | 0.581 | 0.037 | −0.264 | 0.286 |
| 1979 | −0.168 | −0.102 | 0.274 | −0.176 | 0.098 | 0.757 | −0.207 | −0.123 | 0.569 |
| 1980 | 0.039 | 0.745 | 1.225 | 0.110 | 1.246 | 2.000 | −0.034 | 1.066 | 1.676 |
| 1981 | 0.203 | 0.650 | 1.584 | 0.236 | 0.940 | 2.134 | 0.185 | 0.810 | 1.955 |
| 1982 | −0.032 | 0.338 | 1.253 | 0.118 | 0.539 | 1.886 | 0.240 | 0.589 | 1.477 |
| 1983 | 0.204 | 0.332 | 0.851 | 0.252 | 0.578 | 1.470 | 0.221 | 0.256 | 0.648 |
| 1984 | 0.192 | 0.552 | 0.888 | 0.052 | 0.641 | 1.092 | 0.043 | 0.324 | 0.640 |
| 1985 | 0.014 | 0.322 | 0.576 | −0.032 | 0.531 | 0.708 | −0.007 | 0.237 | 0.299 |
| 1986 | 0.108 | 0.339 | | 0.196 | 0.427 | | 0.051 | 0.149 | |
| 1987 | 0.093 | 0.170 | | 0.111 | 0.290 | | 0.078 | 0.015 | |
| 1988 | 0.092 | | | 0.089 | | | −0.037 | | |
| 1989 | −0.063 | | | 0.010 | | | −0.207 | | |
| Average | 0.079 | 0.357 | 0.841 | 0.102 | 0.464 | 1.073 | 0.063 | 0.344 | 0.842 |
| $t$-statistic | 3.379 | 6.164 | 7.630 | 3.746 | 4.524 | 5.939 | 2.076 | 3.475 | 7.104 |
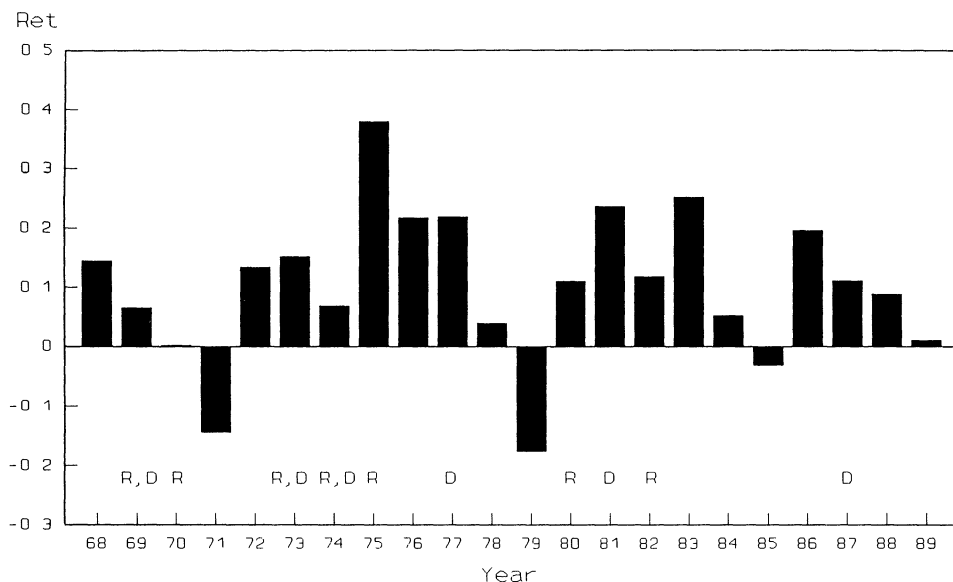
**Figure 2. Year-by-year returns: Value minus glamour.** At the end of each April between 1968 and 1989, 9 groups of stocks are formed. The stocks are independently sorted in ascending order into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) based on each of two variables: cash-flow-to-price ($C/P$) and growth-in-sales ($GS$). The value portfolio consists of those stocks in the highest $C/P$ groups and the lowest $GS$ group. The glamour portfolio consists of those stocks in the lowest $C/P$ group and the highest $GS$ group. The numbers presented are annual buy-and-hold returns for the value portfolio minus returns for the glamour portfolio. Annual buy-and-hold returns are calculated beginning at the end of April for the given year. $R$ indicates NBER recession years, and $D$ indicates years in which the CRSP equally weighted index declined in nominal terms.

period. We consider differences in cumulative returns between deciles $(9, 10)$ and $(1, 2)$ for $C/P$ and $B/M$, and between groups $(3, 1)$ and $(1, 3)$ for $(C/P, GS)$ over 1-, 3-, and 5-year holding horizons starting each year in the sample (1968, 1969, etc.). The arithmetic mean across years for each horizon is reported at the bottom of each column along with $t$-statistics for the test of the hypothesis that the difference in returns between value and glamour portfolios is equal to zero. Standard errors for $t$-tests involving overlapping 3- and 5-year horizons are computed using the method of Hansen-Hodrick (1980), assuming annual $MA_{(2)}$ and $MA_{(4)}$ processes, respectively.

The results show that value strategies have consistently outperformed glamour strategies. Using a 1-year horizon, value outperformed glamour in 17 out of 22 years using $C/P$ to classify stocks, in 19 out of 22 years using $C/P$ and $GS$, and in 17 out of 22 years using the $B/M$ ratio. As we move to longer horizons, the consistency of performance of the value strategy relative to the glamour strategy increases. For all three classification schemes, the value portfolio outperforms the glamour portfolio over every 5-year horizon in the sample period.

These numbers pose a stiff challenge to any risk-based explanation for the higher returns on value stocks. Consider the $(C/P, GS)$ classification. Over a 3-year horizon, the value strategy underperformed the glamour strategy in only two instances. In those instances, the magnitude of the value strategy's underperformance was small relative to its mean outperformance of 46.4 percent. Over any 5-year horizon in the sample, the value strategy was a sure winner. Even for a one-year horizon, the downside of this strategy was fairly low. To explain these numbers with a multifactor risk model would require that the relatively few instances of underperformance of the value portfolio are tightly associated with very bad states of the world as defined by some payoff relevant factor. Put another way, the covariance between the negative realizations of the value minus glamour return and this payoff-relevant factor should be high and the risk-premium associated with that factor should also be quite high.

While it is difficult to reject a risk-based explanation which relies on an unspecified multifactor model, we can examine a set of important payoff-relevant factors that are likely to be associated with large risk premia. If, after examining the association between the negative relative returns to value and this set of factors, we are unable to make sense of the higher average returns on value strategies, we can conclude that a risk-based explanation is unlikely to work except by appealing to large risk premia on factors that are a priori of lesser payoff relevance.

In examining the payoff relevant factors, we do not restrict ourselves to tightly parameterized models such as the Sharpe-Lintner model or the consumption Capital Asset Pricing Model (using consumption data) which are too likely to lead to rejection of risk-based explanations. For example, we do not assume that beta is the appropriate measure of exposure to the market factor. Instead, we proceed nonparametrically and examine the performance of value strategies in extreme down markets. Moreover, we allow for the possibility that the distribution of stock returns does not provide a complete characterization of good and bad states of the world. Barro (1990) and others find that, while the stock market is useful in predicting economic aggregates such as GNP growth, the $R^2$ is only around 0.4 in the post-war subperiod.

Some evidence on the performance of value and glamour strategies in bad states of the world can be gleaned from Table VI and Figure 2. According to the National Bureau of Economic Research, there were four recessions during our sample period: a mild one from December 1969 to November 1970, a very deep one from November 1973 to March 1975, and also significant ones from January 1980 to July 1980 and July 1981 to November 1982. An examination of Table VI shows that the value strategy did about the same or somewhat better than glamour just before and during the 1970 recession, did much better around the severe recession of 1973 to 1975, did somewhat worse in 1979 to 1980, and did significantly better in 1981 to 1982.[15] It is implausible

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[15] Recall that returns are computed starting at the end of April of the year listed through April of the following year.

to conclude from this that value strategies did particularly badly in recessions, when the marginal utility of consumption is especially high.

A second approach is to compare the performance of value and glamour portfolios in the worst months for the stock market as a whole. Table VII, Panel 1 presents the performance of our portfolios in each of 4 states of the world; the 25 worst stock return months in the sample based on the equally weighted index, the remaining 88 negative months other than the 25 worst, the 122 positive months other than the 25 best, and the 25 best months in the sample. The average difference in returns between value and glamour portfolios for each state is also reported along with $t$-statistics for the test that the difference of returns is equal to zero. The results in this table are fairly clear. Using both the $B/M$ and $(C/P, GS)$ classification schemes, the value portfolio outperformed the glamour portfolio in the market's worst 25 months. For example, using the $(C/P, GS)$ classification, the value portfolio lost an average of 8.6 percent of its value in the worst 25 months, whereas the glamour portfolio lost 10.3 percent of its value. Similarly, using both classification schemes, the value portfolio on average outperformed the glamour portfolio and the index in the next worst 88 months in which the index declined. Using the $(C/P, GS)$ classification, the value portfolio lost 1.5 percent in these months when the index experiences a mild decline, compared to 2.9 percent for the glamour portfolio and 2.3 percent for the index itself. So the value strategy did better when the market fell. The value strategy performed most closely to the glamour strategy in the 122 positive months other than the best 25. In the very best months, the value strategy substantially outperformed the glamour strategy and the index, but not by as much as it does when the market fell sharply. Some care should be taken in interpreting these mean differences for the positive market return months, however, given the low $t$-statistics. Overall, the value strategy performed somewhat better than the glamour strategy in all states and significantly better in some states. If anything, the superior performance of the value strategy was skewed toward negative market return months rather than positive market return months. The evidence in Table VII, Panel 1 thus indicates that the value strategy did not expose investors to greater downside risk.

Table VII, Panel 2 provides numbers analogous to those in Panel 1 except now the states of the world are realizations of real GNP growth.[16] The data are quarterly, so that we have 88 quarters in the sample. These quarters are classified into 4 states of the world; the worst 10 quarters, the next worst 34 quarters, the best 10 quarters, and the next best 34 quarters. The quarterly returns on the various glamour and value portfolios are then matched up with the changes in real GNP for one quarter ahead, since evidence indicates that the stock market leads GNP by approximately one quarter. Average quarterly returns for each portfolio are then computed for each state.

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[16] In an earlier draft of this article we included results using the change in the unemployment rate. The results are quite similar to those for GNP growth.

The results in Panel 2 mirror the basic conclusions from Panel 1; namely, the value strategy has not been fundamentally riskier than the glamour strategy. For both classification schemes, the value strategy performed at least as well as the glamour strategy *in each of the 4 states* and substantially better in most states. Unlike the results in Panel 1, there was some tendency for the relative returns on value to be higher in good states than in bad states, especially for extreme good states. Roughly speaking, value stocks could be described as having higher up-market betas and lower down-market betas than glamour stocks with respect to economic conditions. Importantly, while the value strategy did disproportionately well in extreme good times, its performance in extreme bad times was also quite impressive. Performance in extreme bad states is often the last refuge of those claiming that a high return strategy *must* be riskier, even when conventional measures of risk such as beta and standard deviation do not show it. The evidence indicates some positive relation between relative performance of the value strategy and measures of prosperity, but there are no significant traces of a conventional asset pricing equilibrium in which the higher returns on the value strategy are compensation for higher systematic risk.

Finally, for completeness, Table VIII presents some more traditional risk measures for portfolios using our classification schemes. These risk measures are calculated using annual measurement intervals over the postformation period, because of the problems associated with use of preformation period data (Ball and Kothari (1989)). For each of our portfolios, we have 22 annual observations on its return in the year following the formation, and hence can compute the standard deviation of returns. We also have corresponding returns on the value-weighted CRSP index and the risk-free asset, and hence can calculate a beta for each portfolio.

First, the betas of value portfolios with respect to the value-weighted index tend to be about 0.1 higher than the betas of the glamour portfolios. As we have seen earlier, the high betas probably come from value stocks having higher "up-market" betas,[17] and that, if anything, the superior performance of the value strategy occurs disproportionally during "bad" realizations of the stock market. Even if one takes a very strong pro-beta position, the difference in betas of 0.1 can explain a difference in returns of only up to 1 percent per year (assuming a market risk premium of 8 percent per year) and surely not the 10 to 11 percent difference in returns that we find.

Table VIII also presents average annual standard deviations of the various portfolio returns. The results show that value portfolios have somewhat higher standard deviations of returns than glamour portfolios. Using the $(C/P, GS)$ classification, the value portfolio has an average standard deviation of returns of 24.1 percent relative to 21.6 percent for the glamour portfolio. Three remarks about these numbers are in order. First, we have already shown that, because of its much higher mean return, the value

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[17] De Bondt and Thaler (1987) obtain a similar result for their contrarian strategy based on buying stocks with low past returns.

## Table VII

### Performance of Portfolios in Best and Worst Times

Panel 1: All months in the sample are divided into 25 worst stock return months based on the equally weighted index ($W_{25}$), the remaining 88 negative months other than the 25 worst ($N_{88}$), the 122 positive months other than the 25 best ($P_{122}$), and the 25 best months ($B_{25}$) in the sample.

Panel 1A: At the end of each April between 1968 and 1989, 9 groups of stocks are formed as follows. All stocks are independently sorted into 3 groups ((1) bottom 340 percent, (2) middle 40 percent, and (3) top 30 percent) by the ratio of previous year's cash flow to end-of-April market value of equity ($CP$) and by the preformation 5-year weighted average rank of sales growth ($GS$). The 9 portfolios are intersections resulting from these 2 independent classifications. For each portfolio (changing every April), Panel 1A presents its average return over the $W_{25}$, $N_{88}$, $P_{122}$, and $B_{25}$ months.

Panel 1B: At the end of each April between 1968 and 1989, 10-decile portfolios are formed based on the ratio of end-of-previous-year's book value of equity to end-of-April market value of equity ($B/M$). For each portfolio (changing every April), Panel 1B presents its average return over the $W_{25}$, $N_{88}$, $P_{122}$, and $B_{25}$ months.

Panels 2A and 2B have the same structure, but the states are defined in terms of the best and worst quarters for GNP growth. All quarters in the sample are divided into 4 sets: 10 quarters of the lowest real GNP growth during the sample period, 34 next lowest real GNP growth quarters, 34 next worst growth quarters, and 10 highest real GNP growth quarters.

In Panel 2A, the value portfolio contains stocks ranking in the top group on $C/P$ and in the bottom group on $GS$. The Glamour portfolio contains stocks ranking in the bottom group on $C/P$ and in the top group on $GS$. In Panel 2B, the Value portfolio contains stocks ranking in the top two deciles on $B/M$. The Glamour portfolio contains stocks ranking in the bottom two deciles on $B/M$. The right-most column contains the $t$-statistic for testing the hypothesis that the difference in returns between the Value and Glamour portfolios is equal to zero.

#### Panel 1: Portfolio Returns across Best and Worst Stock Market Months

##### Panel 1A

| | | Glamour | | | | | Value | | | | Value-Glamour | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $C/P$ | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | | $(1, 3 - 3, 1)$ | |
| $GS$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | Index | | $t$-Statistic |
| $W_{25}$ | −0.114 | −0.103 | −0.103 | −0.090 | −0.091 | −0.100 | −0.086 | −0.080 | −0.105 | −0.102 | 0.018 | 3.040 |
| $N_{88}$ | −0.023 | −0.025 | −0.029 | −0.016 | −0.020 | −0.025 | −0.015 | −0.016 | −0.022 | −0.023 | 0.014 | 4.511 |
| $P_{122}$ | 0.039 | 0.039 | 0.038 | 0.040 | 0.038 | 0.039 | 0.040 | 0.038 | 0.038 | 0.037· | 0.002 | 0.759 |
| $B_{25}$ | 0.131 | 0.111 | 0.110 | 0.110 | 0.104 | 0.115 | 0.124 | 0.113 | 0.124 | 0.121 | 0.014 | 1.021 |

##### Panel 1B

| | Glamour | | | | | | | | Value | | | Value-Glamour | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $B/M$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Index | $(9, 10 - 1, 2)$ | $t$-Statistic |
| $W_{25}$ | −0.112 | −0.110 | −0.104 | −0.100 | −0.097 | −0.091 | −0.093 | −0.092 | −0.098 | −0.102 | −0.102 | 0.011 | 1.802 |
| $N_{88}$ | −0.029 | −0.028 | −0.026 | −0.025 | −0.023 | −0.020 | −0.021 | −0.020 | −0.018 | −0.022 | −0.023 | 0.008 | 2.988 |
| $P_{122}$ | 0.038 | 0.040 | 0.039 | 0.037 | 0.036 | 0.037 | 0.038 | 0.037 | 0.038 | 0.039 | 0.037 | −0.001 | −0.168 |
| $B_{25}$ | 0.114 | 0.114 | 0.119 | 0.113 | 0.112 | 0.113 | 0.117 | 0.126 | 0.133 | 0.148 | 0.121 | 0.026 | 1.729 |

**Table VII**—*Continued*

**Panel 2: Portfolio Returns across Best and Worst GNP Growth Quarters**

**Panel 2A**

| C/P | 1 | 1 | Glamour 1 | 2 | 2 | 2 | Value 3 | 3 | 3 | GNP | Value-Glamour (1, 3 − 3, 1) | t-Statistic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | | | |
| Worst 10 | 0.032 | 0.014 | −0.009 | 0.037 | 0.016 | 0.013 | 0.041 | 0.020 | 0.008 | −0.017 | 0.050 | 2.485 |
| Next worst 34 | 0.021 | 0.010 | 0.011 | 0.018 | 0.014 | 0.011 | 0.027 | 0.023 | 0.012 | 0.000 | 0.016 | 1.473 |
| Next best 34 | 0.026 | 0.029 | 0.026 | 0.040 | 0.033 | 0.029 | 0.046 | 0.046 | 0.034 | 0.012 | 0.020 | 2.176 |
| Best 10 | 0.122 | 0.107 | 0.103 | 0.140 | 0.123 | 0.123 | 0.139 | 0.133 | 0.136 | 0.031 | 0.036 | 1.786 |

**Panel 2B**

| B/M | Glamour 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Value 9 | 10 | GNP | Value-Glamour (9, 10 − 1, 2) | t-Statistic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worst 10 | −0.004 | 0.001 | 0.012 | 0.018 | 0.009 | 0.016 | 0.017 | 0.028 | 0.021 | 0.015 | −0.017 | 0.020 | 0.983 |
| Next worst 34 | 0.011 | 0.008 | 0.011 | 0.009 | 0.008 | 0.010 | 0.010 | 0.016 | 0.017 | 0.012 | 0.000 | 0.005 | 0.494 |
| Next best 34 | 0.022 | 0.028 | 0.027 | 0.025 | 0.030 | 0.035 | 0.036 | 0.035 | 0.041 | 0.039 | 0.012 | 0.015 | 1.555 |
| Best 10 | 0.092 | 0.102 | 0.118 | 0.117 | 0.117 | 0.135 | 0.132 | 0.141 | 0.145 | 0.151 | 0.031 | 0.051 | 2.685 |

**Table VIII**

## Traditional Risk Measures for Portfolios

For each portfolio described below, we compute, using 22 year-after-the-formation returns as observations, its beta with respect to the value-weighted index. Using the 22 formation periods, we also compute the standard deviation of returns and the standard deviation of size-adjusted returns in the year after formation.

Panel 1: At the end of each April between 1968 and 1989, 10-decile portfolios are formed based on the ratio of previous-year's cash flow to end-of-April market value of equity ($C/P$). For each decile portfolio, Panel 1 presents its beta, standard deviation of returns, and standard deviation of size-adjusted returns defined above.

Panel 2: At the end of each April between 1968 and 1989, 9 groups of stocks are formed as follows. All stocks are independently sorted into 3 groups ((1) bottom 30 percent, (2) middle 40 percent, and (3) top 30 percent) by the ratio of previous-year's cash flow to end-of-April market value of equity ($C/P$) and by the preformation 5-year weighted-average rank of sales growth ($GS$). The 9 portfolios are intersections resulting from these 2 independent classifications. For each group of stocks, Panel 2 presents its beta, standard deviation of returns, and standard deviation of size-adjusted returns defined above.

Panel 3: At the end of each April between 1968 and 1989, 10-decile portfolios are formed based on the ratio of end-of-previous year's book value of equity to end-of-April market value of equity ($B/M$). For each decile portfolio, Panel 3 presents its beta, standard deviation of returns, and standard deviation of size-adjusted returns defined above.

| | | | | | | | | | | | Panel 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $C/P$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Equally Weighted Index |
| $\beta$ | 1.268 | 1.293 | 1.321 | 1.333 | 1.318 | 1.237 | 1.182 | 1.247 | 1.224 | 1.384 | 1.304 |
| Standard deviation | 0.224 | 0.227 | 0.239 | 0.237 | 0.232 | 0.221 | 0.212 | 0.223 | 0.224 | 0.252 | 0.250 |
| Standard deviation of size-adjusted return | 0.037 | 0.044 | 0.049 | 0.036 | 0.033 | 0.034 | 0.042 | 0.036 | 0.048 | 0.058 | — |

**Table VIII**—*Continued*

**Panel 2**

| C/P | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | Equally Weighted Index |
|---|---|---|---|---|---|---|---|---|---|---|
| GS | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | |
| $\beta$ | 1.249 | 1.296 | 1.293 | 1.239 | 1.184 | 1.214 | 1.330 | 1.258 | 1.322 | 1.304 |
| Standard deviation | 0.216 | 0.232 | 0.241 | 0.215 | 0.207 | 0.213 | 0.242 | 0.224 | 0.241 | 0.250 |
| Standard deviation of size-adjusted return | 0.061 | 0.040 | 0.066 | 0.049 | 0.033 | 0.047 | 0.066 | 0.047 | 0.065 | — |

**Panel 3**

| B/M | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Equally Weighted Index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $\beta$ | 1.248 | 1.268 | 1.337 | 1.268 | 1.252 | 1.214 | 1.267 | 1.275 | 1.299 | 1.443 | 1.304 |
| Standard deviation | 0.223 | 0.223 | 0.236 | 0.225 | 0.221 | 0.214 | 0.225 | 0.233 | 0.248 | 0.276 | 0.250 |
| Standard deviation of size-adjusted return | 0.076 | 0.050 | 0.040 | 0.035 | 0.031 | 0.040 | 0.035 | 0.043 | 0.046 | 0.071 | — |

strategy's higher standard deviation does not translate into greater downside risk. Second, the higher standard deviation of value stocks appears to be due largely to their smaller average size, since the standard deviation of size-adjusted returns is virtually the same for value and glamour portfolios. But the results in Table III suggest that, by focusing on larger value stocks, investors could still get most of the extra return from value stocks without this higher standard deviation. The extra return on a portfolio of large value stocks cannot therefore be explained by appealing to its higher standard deviation. Finally, the difference in standard deviation of returns between value and glamour portfolios (24.1 versus 21.6 percent per year) is quite small in comparison to the difference in average return (10 percent per year). For example, over the 1926 to 1988 period the extra return on the S & P 500 over T-bills was approximately 8 percent per year, while the average standard deviation on the S & P 500 was 21 percent compared to 3 percent for T-bills. In comparison to the reward-to-risk ratio for stocks vis-à-vis T-bills, the reward-to-risk ratio for investing in value stocks is extremely high. A risk model based on differences in standard deviation cannot explain the superior returns on value stocks.

## VI. Summary and Interpretation of the Findings

The results in this article establish (in varying degrees of detail) three propositions. First, a variety of investment strategies that involve buying out-of-favor (value) stocks have outperformed glamour strategies over the April 1968 to April 1990 period. Second, a likely reason that these value strategies have worked so well relative to the glamour strategies is the fact that the actual future growth rates of earnings, cash flow, etc. of glamour stocks relative to value stocks turned out to be much lower than they were in the past, or as the multiples on those stocks indicate the market expected them to be. That is, market participants appear to have consistently overestimated future growth rates of glamour stocks relative to value stocks. Third, using conventional approaches to fundamental risk, value strategies appear to be no riskier than glamour strategies. Reward for bearing fundamental risk does not seem to explain higher average returns on value stocks than on glamour stocks.

While one can never reject the "metaphysical" version of the risk story, in which securities that earn higher returns must *by definition* be fundamentally riskier, the weight of evidence suggests a more straightforward model. In this model, out-of-favor (or value) stocks have been underpriced relative to their risk and return characteristics, and investing in them has indeed earned abnormal returns.

This conclusion raises the obvious question: how can the 10 to 11 percent per year in extra returns on value stocks over glamour stocks have persisted for so long? One possible explanation is that investors simply did not know about them. This explanation has some plausibility in that quantitative

portfolio selection and evaluation are relatively recent activities. Most investors might not have been able, until recently, to perform the analysis done in this article. Of course, advocacy of value strategies is decades old, going back at least to Graham and Dodd (1934). But such advocacy is usually not accompanied by defensible statistical work and hence might not be entirely persuasive, especially since many other strategies are advocated as well.

Another possible explanation is that we have engaged in data snooping (Lo and MacKinlay (1990)) and have merely identified an ex post pattern in the data. Clearly, these data have been mined in the sense that others have looked at much of these same data before us. On the other hand, we think there is good reason to believe that the cross-sectional return differences reported here reflect an important economic regularity rather than sampling error. First, similar findings on the superior returns of value strategies have been obtained for several different time series. Davis (1994) finds similar results on a subsample of large U.S. firms over the period 1931 to 1960. Chan, Hamao and Lakonishok (1991) find similar results for Japan. Capaul, Rowley, and Sharpe (1993) find similar results for France, Germany, Switzerland, and the United Kingdom, as well as for the United States and Japan.

Second, we have documented more than just a cross-sectional pattern of returns. The evidence suggests a systematic pattern of expectational errors on the part of investors that is capable of explaining the differential stock returns across value and glamour stocks. Investor expectations of future growth appear to have been excessively tied to past growth despite the fact that future growth rates are highly mean reverting. In particular, investors expected glamour firms to continue growing faster than value firms, but they were systematically disappointed. La Porta (1993) shows that a similar pattern of expectational errors and returns on value strategies obtains when growth expectations are measured by analysts' 5-year earnings growth forecasts rather than by financial ratios such as $E/P$ or $C/P$. The evidence on expectational errors supports the view that the cross-sectional differences in returns reflect a genuine economic phenomenon.

We conjecture that the results in this article can best be explained by the preference of both individual and institutional investors for glamour strategies and by their avoidance of value strategies. Below we suggest some reasons for this preference that might potentially explain the observed returns anomaly.

Individual investors might focus on glamour strategies for a variety of reasons. First, they may make judgment errors and extrapolate past growth rates of glamour stocks, such as Walmart or Microsoft, even when such growth rates are highly unlikely to persist in the future. Putting excessive weight on recent past history, as opposed to a rational prior, is a common judgment error in psychological experiments and not just in the stock market. Alternatively, individuals might just equate well-run firms with good investments, regardless of price. After all, how can you lose money on Microsoft or Walmart? Indeed, brokers typically recommend "good" companies with "steady" earnings and dividend growth.

Presumably, institutional investors should be somewhat more free from judgment biases and excitement about "good companies" than individuals, and so should flock to value strategies.[18] But institutional investors may have reasons of their own for gravitating toward glamour stocks. Lakonishok, Shleifer, and Vishny (1992b) focus on the agency context of institutional money management. Institutions might prefer glamour stocks because they appear to be "prudent" investments, and hence are easy to justify to sponsors. Glamour stocks have done well in the past and are unlikely to become financially distressed in the near future, as opposed to value stocks, which have previously done poorly and are more likely to run into financial problems. Many institutions actually screen out stocks of financially distressed firms, many of which are value stocks, from the universe of stocks they pick. Indeed, sponsors may mistakenly believe glamour stocks to be safer than value stocks, even though, as we have seen, a portfolio of value stocks is no more risky. The strategy of investing in glamour stocks, while appearing "prudent," is not prudent at all in that it earns a lower expected return and is not fundamentally less risky. Nonetheless, the career concerns of money managers and employees of their institutional clients may cause money managers to tilt towards "glamour" stocks.

Another important factor is that most investors have shorter time horizons than are required for value strategies to consistently pay off (De Long *et al*. (1990) and Shleifer and Vishny (1990)). Many individuals look for stocks that will earn them high abnormal returns within a few months, rather than 4 percent per year over the next 5 years. Institutional money managers often have even shorter time horizons. They often cannot afford to underperform the index or their peers for any nontrivial period of time, for if they do, their sponsors will withdraw the funds. A value strategy that takes 3 to 5 years to pay off but may underperform the market in the meantime (i.e., have a large tracking error) might simply be too risky for money managers from the viewpoint of career concerns, especially if the strategy itself is more difficult to justify to sponsors. If a money manager fears getting fired before a value strategy pays off, he will avoid using such a strategy. Importantly, while tracking error can explain why a money manager would not want too strong a tilt toward *either* value or growth, it does not explain why he would not tilt slightly toward value given its apparently superior risk/return profile. Hence, these horizon and tracking error issues *can* explain why money managers do not more aggressively "arbitrage" the differences in returns across value and glamour stocks, but they *cannot* explain why such differences are there in the first place. In our view, such return differences are ultimately explained by the tendency of investors to make judgmental errors and perhaps also by a tendency for institutional investors to actively tilt toward glamour to make their lives easier.

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[18] According to Dreman (1977), professional money managers are also quite likely to suffer from these biases.

Are the anomalous excess returns on value stocks likely to persist? It is possible that over time more investors will become convinced of the value of being a contrarian with a long horizon and the returns to value strategies will fall. Perhaps the recent move into disciplined quantitative investment strategies, evaluated based only on performance and not on individual stock picks, will increase the demand for value stocks and reduce the agency problems that result in picking glamour stocks. Such sea changes rarely occur overnight, however. The time-series and cross-country evidence support the idea that the behavioral and institutional factors underlying the higher returns to value stocks have been pervasive and enduring features of equity markets.

Perhaps the most interesting implication of the conjecture that institutional investors gravitate toward glamour stocks is that this may explain their inferior performance. In an earlier article, we focused on the striking underperformance of pension fund money managers relative to the market index (Lakonishok, Shleifer, and Vishny (1992b)). The large difference in returns on glamour and value stocks can, at least in principle, explain why money managers have underperformed the market by over 100 basis points per year before accounting for management fees. By looking at the actual portfolios of institutional money managers, one can find out whether they have been overinvested in glamour stocks and underinvested in value stocks. We plan to do that in a follow-up article.

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